TECHNOLOGY DEPARTMENT

MARCH 15, 1959
Price 50c

TELEPHONE ENGINEER & MANAGEMENT

vol 63 #6,

Exclusive
PLANT MAN'S "SPEC" BOOK
Page 58

Exclusive
ELECTRONICS NOTEBOOK
Page 41

Exclusive
COMMERCIAL NOTES
Page 47

1 out of 13

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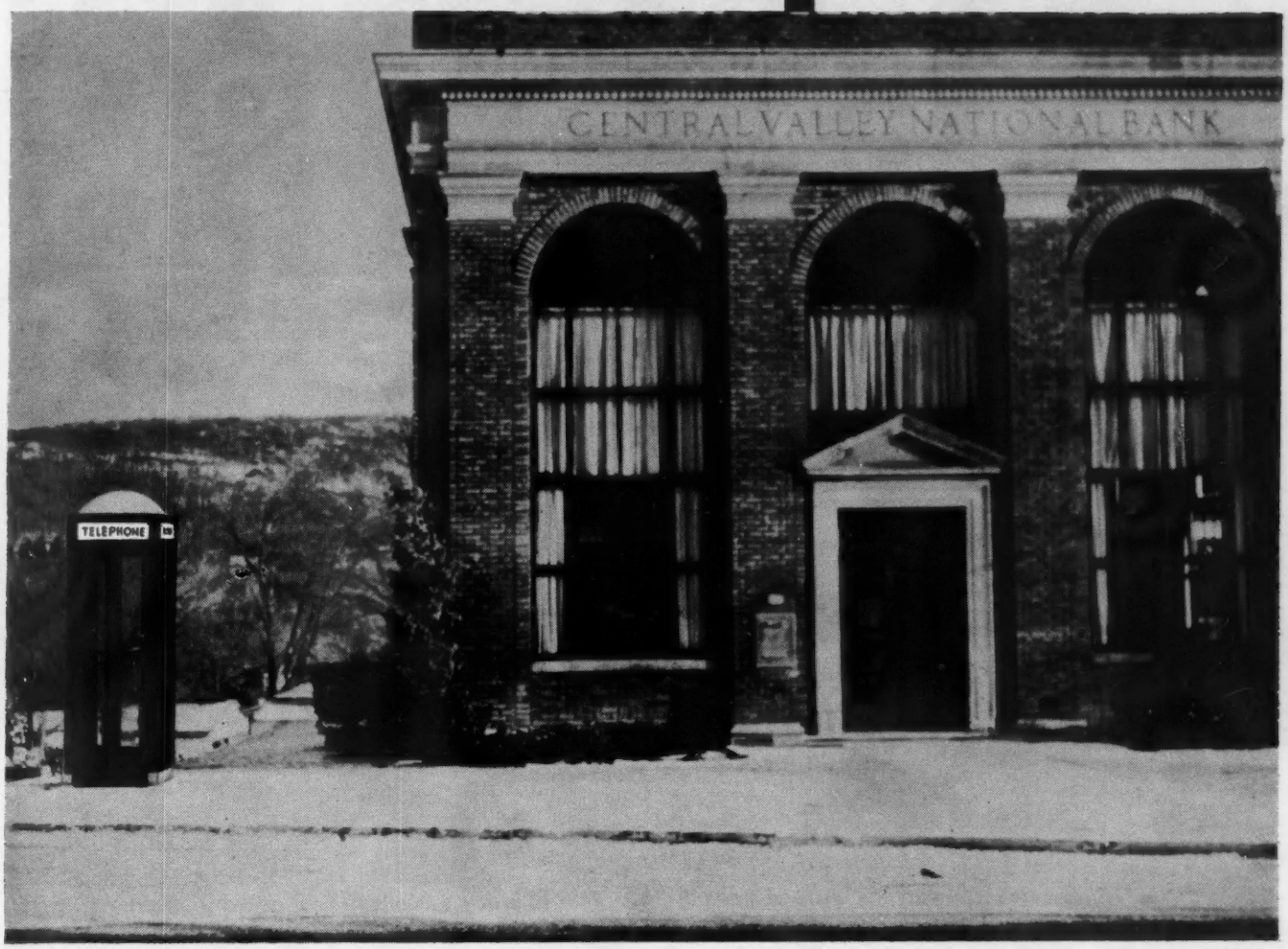

Fred Florance, president and general manager of the Highland Telephone Company, is one man who knows a trend from a transiency. That's how, years ago, he knew that the development of the Hudson Valley in New York state was just the beginning of a long-term expansion. That's why, years ago, Mr. Florance chose Sherron steel booths for many of his indoor and outdoor installations. He knew that a growing community would require more and better communication facilities. Facilities that would provide round-the-clock, trouble-free service . . . that would retain their good looks and solid construction after years of constant use in all kinds of weather. The booth pictured here is a Sherron Model 17-S Type 7 outdoor booth with plastic Astra-Dome. It is located in Central Valley, N. Y., on State Highway 32, in the heart of the Hudson Valley. Highland Telephone is typical of the 4000 Independents which, in conjunction with the Bell System, provide the finest communications service in the world.

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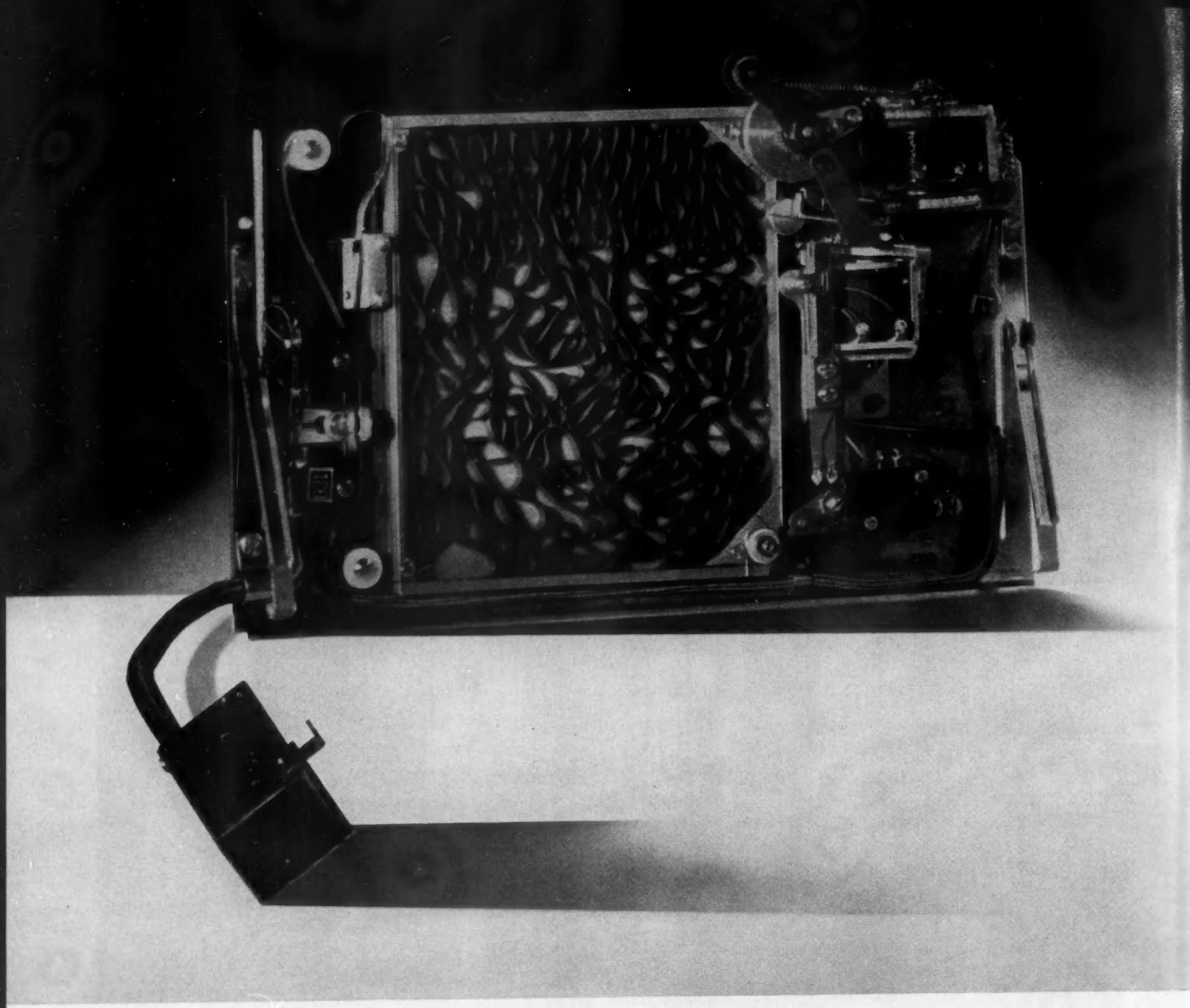

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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

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FRONT COVER

Southern Bell Tel. & Tel. Co., Installer-Repairman R. A. Bourchell, Augusta, Ga., gained two interested, willing and questioning young helpers as he prepared to add another station to Southern Bell's growing total. We don't know the names of the young ladies, but we can guarantee they're going to make sure that new telephone is properly installed. — (Photo from Southern Telephone News.)

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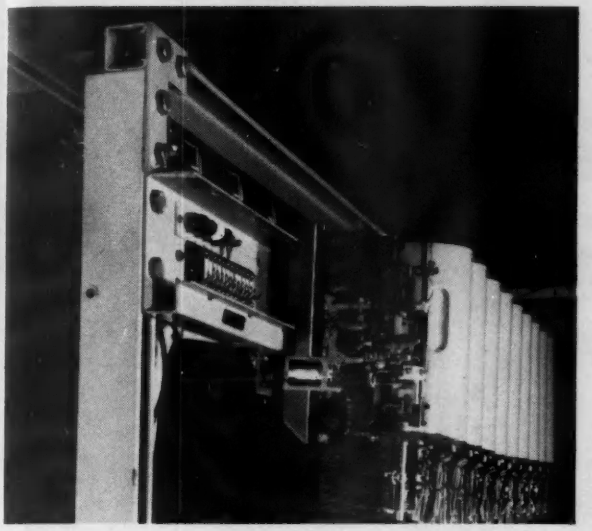

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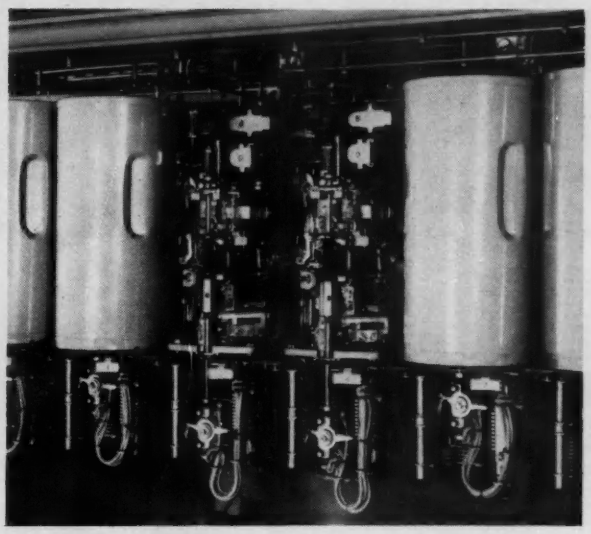
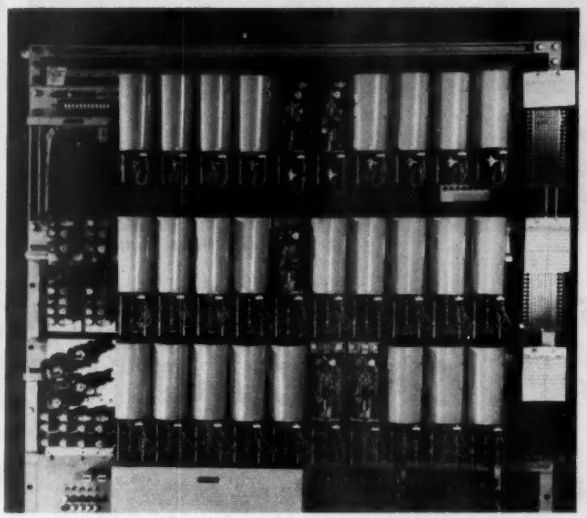
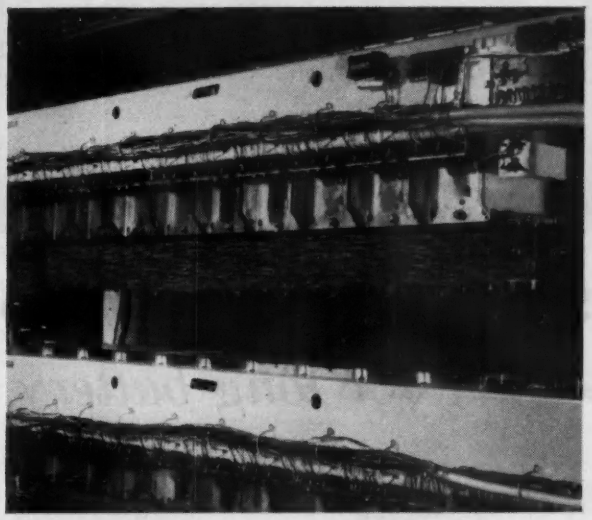


2—Simplified circuit design cuts number of relays in all selector switches. Marked by vertical bank instead of post spring; simpler digit absorbing. All selector switches have faster-than-normal operation.



3—Linefinders also feature simplified design, with number of relays reduced to two and vertical bank eliminated. Automatic self-checking of linefinder and control circuits.



4—Superior wiring: insulated with a semi-rigid polyvinyl chloride covering. Line circuits are mounted on fiberglass bars; shelves are strap wired: no excess wires except those needed for future growth. Solderless, automatic wire wrapping on terminals and relays.

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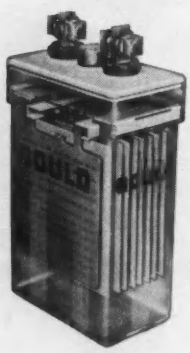

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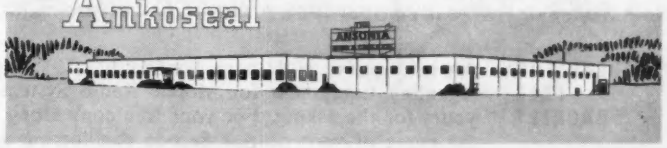

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OHIO Telephone Association, Deshler Hilton Hotel, Columbus, April 13-15, 1959.

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NEBRASKA Telephone Association, Hotel Cornhusker, Lincoln, Apr. 21-22, 1959.

INDIANA Telephone Association, Claypool Hotel, Indianapolis, Ind., May 6-7, 1959.

WISCONSIN Telephone Association, Plankington House, Milwaukee, May 13-14, 1959.

KANSAS - MISSOURI Telephone Associations, Continental Hotel, Kansas City, Mo., May 25-26, 1959.

PENNSYLVANIA Telephone Association, Buck Hill Falls Inn, Buck Hill Falls, June 1-3, 1959.

CALIFORNIA Telephone Association, Ambassador Hotel, Los Angeles, June 3-5, 1959.

WASHINGTON-OREGON Telephone Associations, Olympic Hotel, Seattle, Washington, June 11-12-13, 1959.

NEW YORK Telephone Association, Scaroon Manor, Schroon Lake, June 15-17, 1959.

TENNESSEE Telephone Association, Hermitage Hotel, Nashville, Tennessee, Sept. 9-10, 1959.

ARKANSAS Telephone Association, Arlington Hotel, Hot Springs, Ark., Sept. 14-15, 1959.

MICHIGAN Telephone Association, Pantlind Hotel, Grand Rapids, Mich., September 15, 16, 17, 1959.

ROCKY MOUNTAIN Tel. Association, Utah Hotel, Salt Lake City, Utah, September 21-23, 1959.

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- CLASSIFIED DIRECTORY
- MILEAGE RECORD
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ENGINEERING

- CROSS-INDEX TO CORRESPONDENCE
- MAP DESK ASSEMBLY
- PROJECT RECORD
- RECORD OF ESTIMATES
- STATE OF CONSTRUCTION PROJECTS

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- LEFT IN EQUIPMENT RECORDS
- LINE CARD FILING
- ROUTING AND ORDER DISPATCHING
- TOLL TICKET SORTING
- PARTS INDEX AND BIN LOCATION

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- AND MANY OTHERS

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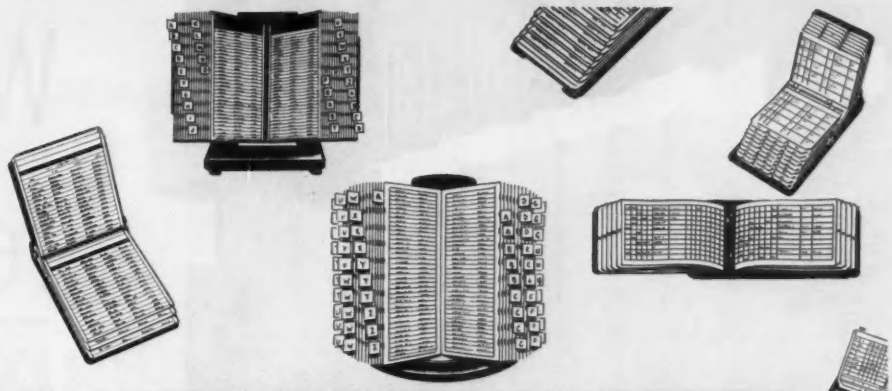
AND MANY OTHERS



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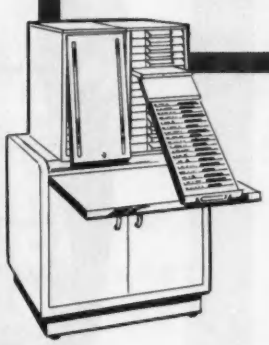

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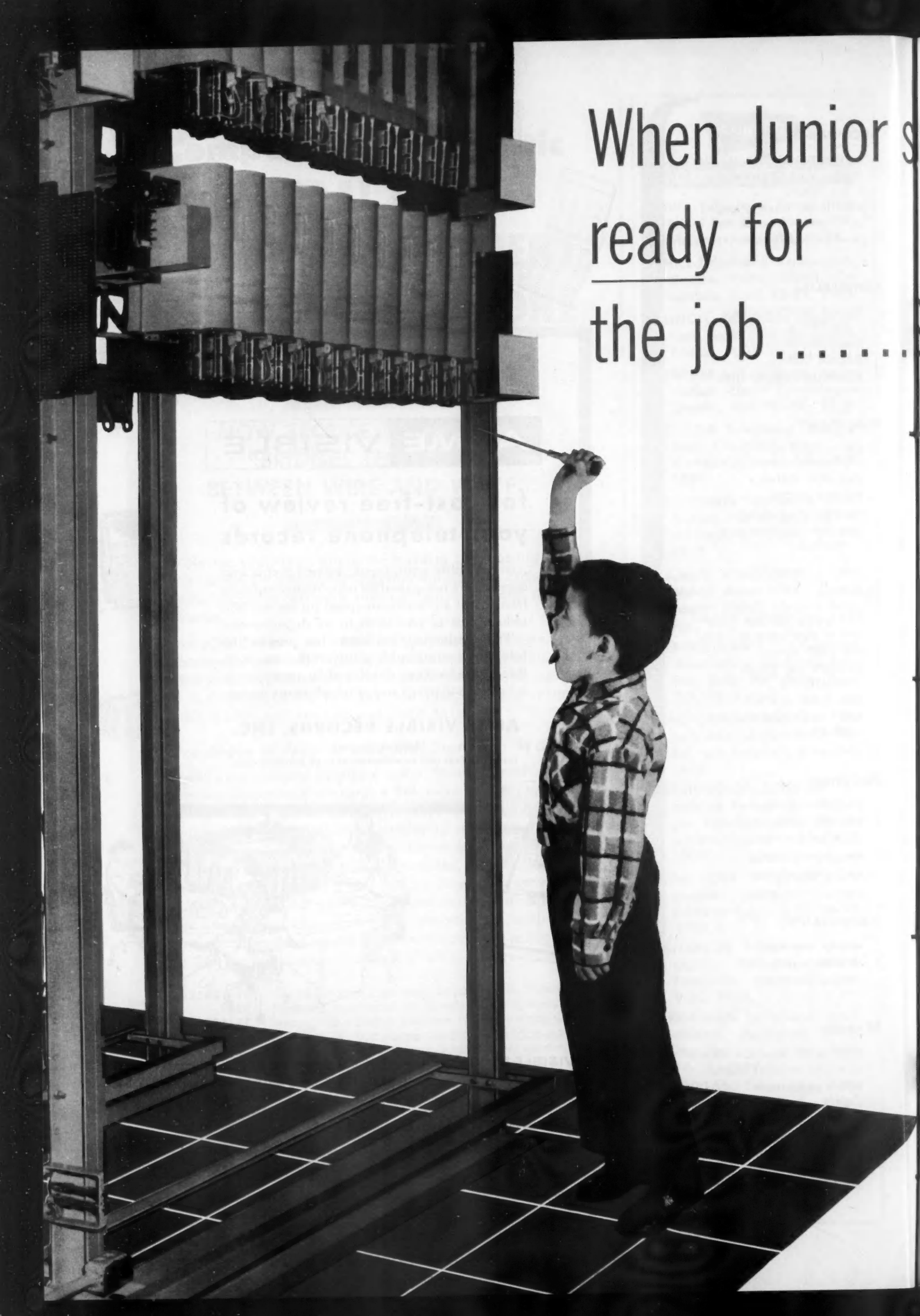
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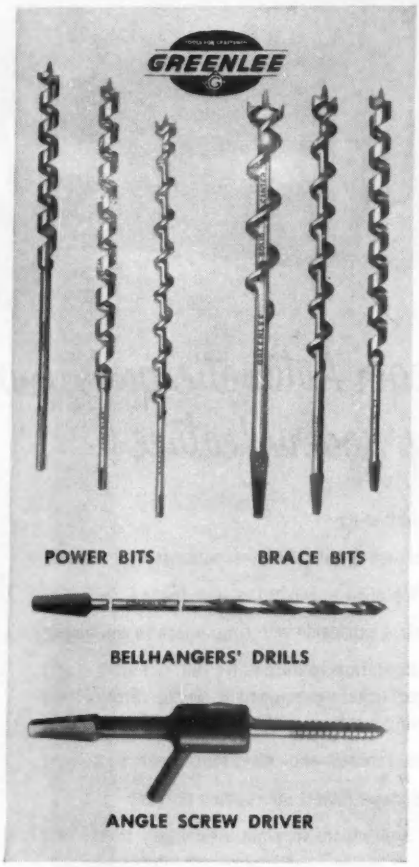

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WASHINGTON OBSERVATIONS

by ROLAND DAVIES and FRED HENCK

"Communications Excise Tax"

BY LATE February, 46 members of the House and Senate had introduced 51 bills which would repeal the excise tax on communications services, cut them in half, or terminate them by 1960.

Washington "Numbers Game"

ONE OF the most interesting "numbers games" on Capitol Hill in some years is being played in a game very close to the hearts of telephone operating people and their customers — the proposals to repeal the wartime excise taxes on communications services.

By late February, an up-to-date count showed that 46 members of the House and Senate had introduced a total of 51 bills which would repeal the communications taxes, cut them in half, or put a June 30, 1960, termination date on the communications excises.

Displaying a wide cross-section of Congressional opinion, the bills have been offered by 29 Democrats and 17 Republicans, from 19 states in all sections of the country. In addition, several members of Congress have published statements in the Congressional Record in opposition to communications excises, but have not introduced bills to this effect. Reason for the fact that 46 members have introduced 51 hills is, of course, that some members have introduced two or more bills, trying different approaches to the overall objective.

Numerical weight of the bills introduced does not mean in itself that anything will happen in Congress this year to reduce or repeal communications excises. In fact, the key man in the whole proposition, Chairman Wilbur Mills (D., Ark.) of the House Ways & Means Committee, has made it pretty plain that a communications excise reduction or repeal measure will not clear his committee this year.

ROLAND DAVIES, left, editor of TE&M's "Washington Observations" is editor of "Telecommunications Reports," and FRED HENCK, right, co-editor of TE&M's "Washington Observations," is executive editor of "Telecommunications Reports," Washington, D. C.

Rep. Mills is a key man not only because he heads the tax-writing committee in one of the two houses of Congress, but, perhaps more importantly, tax bills must originate in the House.

Happily for communications excise repeal proponents, however, there is another alternative. When a tax bill of any kind reaches the Senate, there is nothing to stop that chamber from tacking on amendments. It seems pretty certain that several Senators will offer such amendments, and that their prospects for Senate approval are better than they were last year, when they came pretty close to adoption.

It is also assured that at least one tax bill will reach the Senate this year, since the present corporate income tax rates, and the excise rates which come up for automatic expiration if not extended — and these do not include the communications levies — must be extended for the usual one-year period if the government is

Please turn to page 20

STUDEBAKER VEHICLES CAN SUBSTANTIALLY LOWER THE COST TO YOUR TELEPHONE COMPANY OF FLEET TRANSPORTATION

First things first. The first cost of Studebakers, both trucks and The Lark line, is below that of competition. All Studebaker vehicles have been engineered and constructed to produce an honest day's work *every day* on the job. Fuel consumption is low. Downtime is minimized because engines and running gear are rapidly accessible, sturdily built and simplified in design. And in the event of accident, The Lark's bolt-on fenders and grille cut the cost of sheet metal repairs. An important bonus feature is The Lark's space-saving capability. Each Lark requires 18 sq. ft. less parking space than conventional cars due to its 14½ ft. length. Multiply the value of this space saving by the number of vehicles in your fleet! Then add in the other savings: Lowest initial cost, less gas, minimum downtime, sound engineering for long service life. There's more to the story. Mail the coupon or contact your Studebaker dealer for the details.

STUDEBAKER VEHICLES HAVE BEEN SELECTED FOR USE BY:

Bell Telephone Company of New York
Illinois Bell Telephone Company
Indiana Bell Telephone Company
Mountain States Telephone and Telegraph
Western Electric

Without obligating myself, I would like to know more about the new dimension in fleet transportation.

MR. A. E. FITZPATRICK, Manager—Fleet Sales
STUDEBAKER-PACKARD CORP./South Bend 27, Indiana

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ADDRESS _____

CITY _____ ZONE _____ STATE _____

TEM-3-15-59

BEST PROVED for bus terminals

the BN Booth

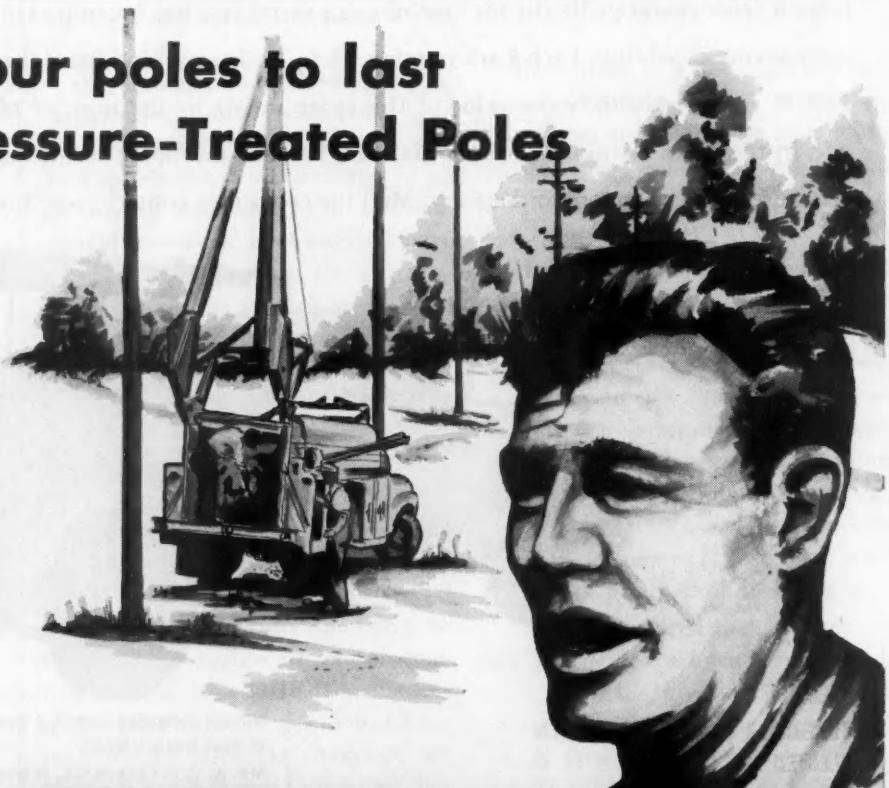
attracts the eye day or night,
promotes more revenue. Colorful, clean, sturdy –
the BN Booth is best for you, too!

For full particulars, consult your distributor or write direct for folder... Benner-Nawman, Inc., 3421 Hollis Street, Oakland 8, California.

a B-N booth is a busy booth!

If you want your poles to last Specify T-C Pressure-Treated Poles

Every pole bearing the T-C brand has received the best in preservation. "The T-C Treatment" makes them last, and give you generations of trouble-free service. Our pressure treating process (and we think you'll agree) is the best yet developed by modern Technology ... and, only the best chemical preservatives are used. That's why we can say—Specify T-C and get the best in preservation.



Specify T-C

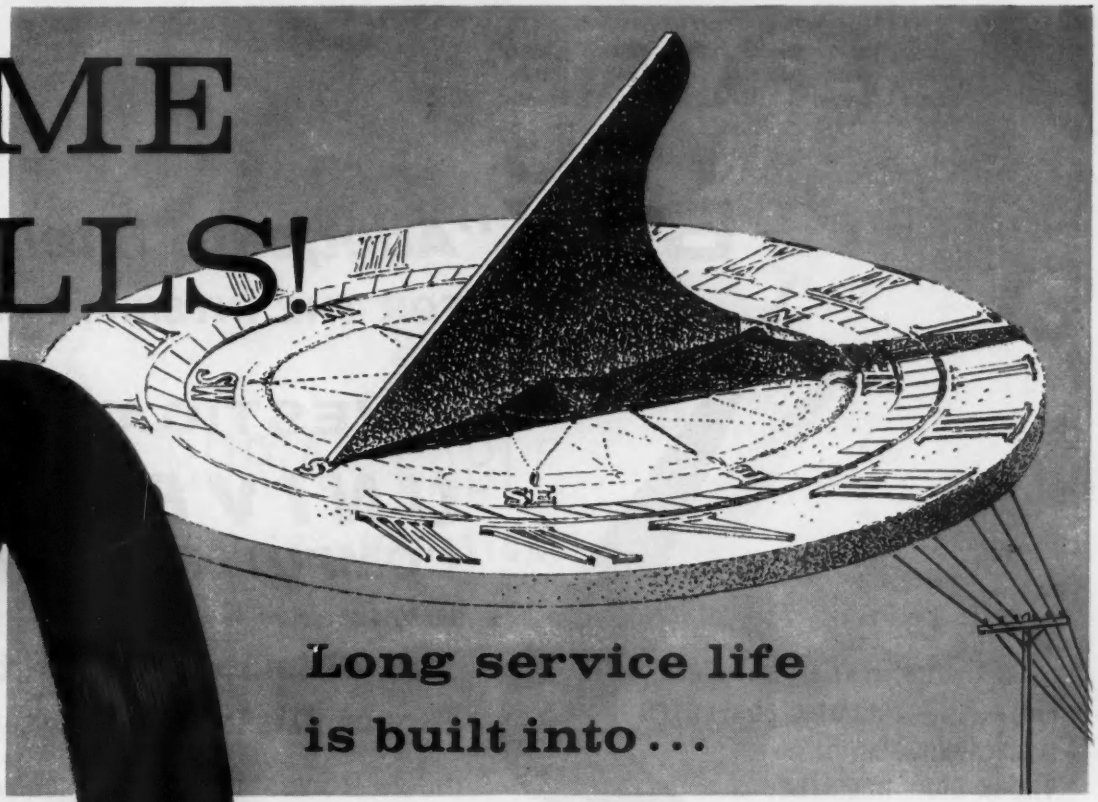
DISTRIBUTED BY AUTOMATIC ELECTRIC SALES CORP. AND LEICH SALES CORP.

TAYLOR-COLQUITT CO. TIMBER CONSERVATION T-C

TAYLOR - COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

TIME TELLS!



Long service life is built into . . .

Copperweld Line Wire T.M.

Through the years, copper has been known for its permanence and conductance . . . steel for its strength. Each of these metals, alone, provides only a part of the qualities necessary for good line wire. All the qualities are brought together when these two time-tested metals are inseparably molten-welded to form Copperweld* Line Wire.

The thick copper covering provides high, lasting conductivity and protection against corrosion. With its protected steel core, Copperweld withstands heavy ice and wind loads, assuring safe and economical long-span construction. Records of companies everywhere show that Copperweld Line Wire gives long service life at lowest annual cost.

*trademark

SOLD BY LEADING DISTRIBUTORS

COPPERWELD STEEL COMPANY

WIRE AND CABLE DIVISION *Glassport, Pa.*

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

CONDUCTIVITY STRENGTH PERMANENCE

PROVED IN SERVICE FOR OVER 40 YEARS

BEFORE YOU BUY *"Adequate Intercept"*

FOR THE INTERIM PERIOD

INVESTIGATE...

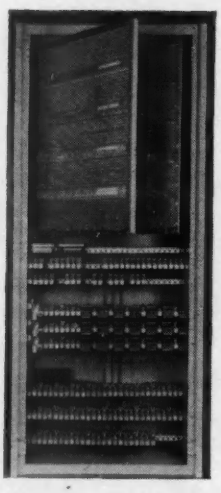
UNIVERSAL COMPUTER INTERCEPT

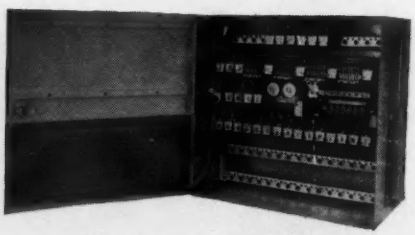
100% Intercept is

The Ultimate Goal of the Direct Distant Dialing Program

Universal 100% Toll Computer Intercept is the *only* intercept that can be installed in a toll center to serve outlying offices. May also be installed in end offices to serve subscribers.

Other ***UNIVERSAL*** Equipment:
Code-to-Selective RINGING CONVERTER
DIGIT ABSORBER
TRUNK DIGIT REGISTER





Cabinet 19"x17"x8" for rack or wall mounting, 60 lines TPL illustrated.

Cabinet 84" x 36" x 12", capacity 40,000 stations, TPL or TPS or any combination of both.

FOR FULL PARTICULARS
PLEASE WRITE DIRECT TO
UNIVERSAL
OR CONSULT YOUR DISTRIBUTOR
FOR DETAILS

TELEPHONE DIVISION

UNIVERSAL
CONTROLS CORPORATION
OFFICE AND PLANT – CARROLLTON, TEXAS
MAIL ADDRESS – P. O. BOX 13122, DALLAS 20, TEXAS
Telephones: Carrollton 3885 — Dallas CH 7-3123

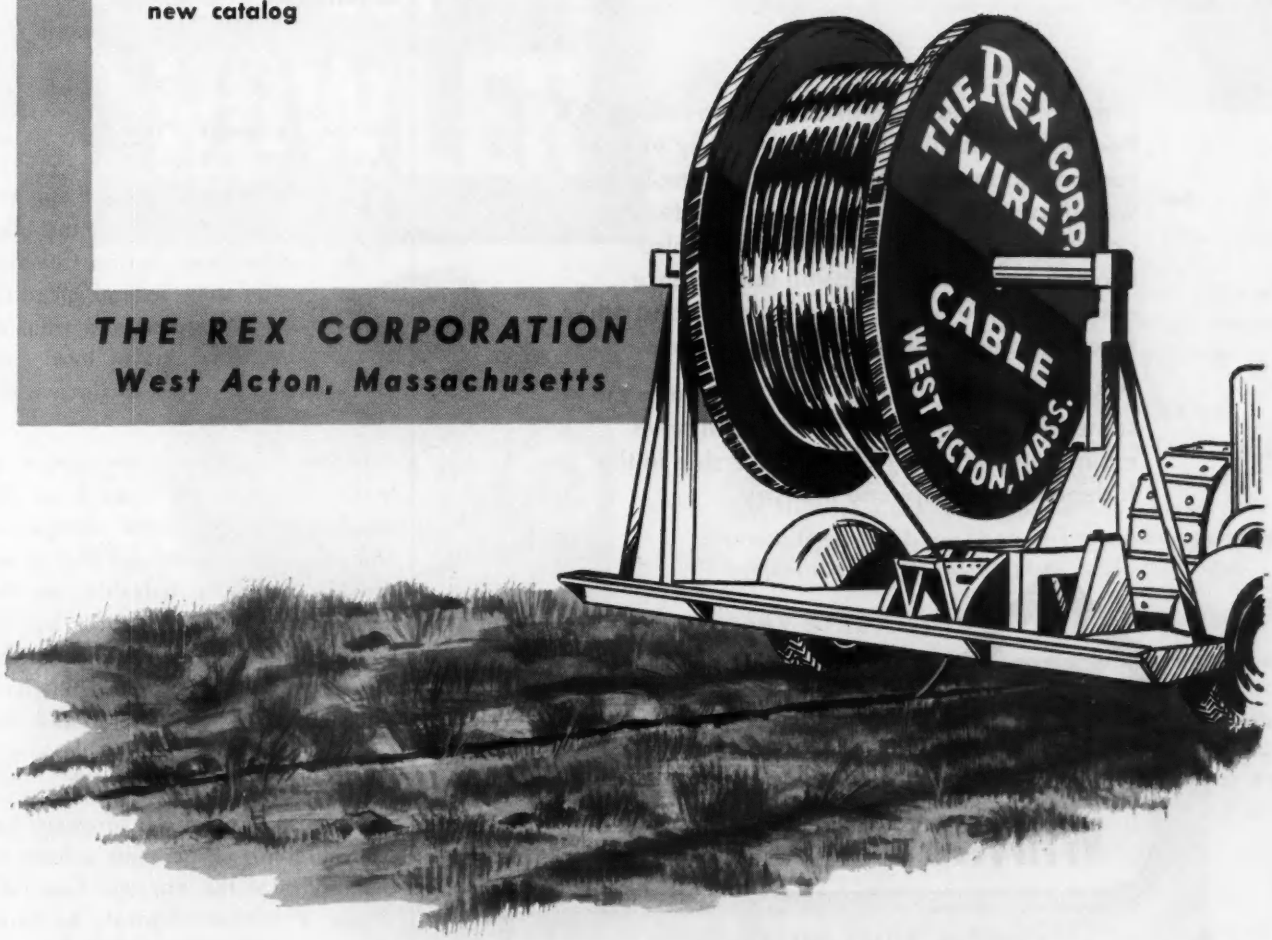
ON ORDERS DIRECT TO UNIVERSAL, BILLING WILL BE THRU YOUR PREFERRED DISTRIBUTOR.

Rex

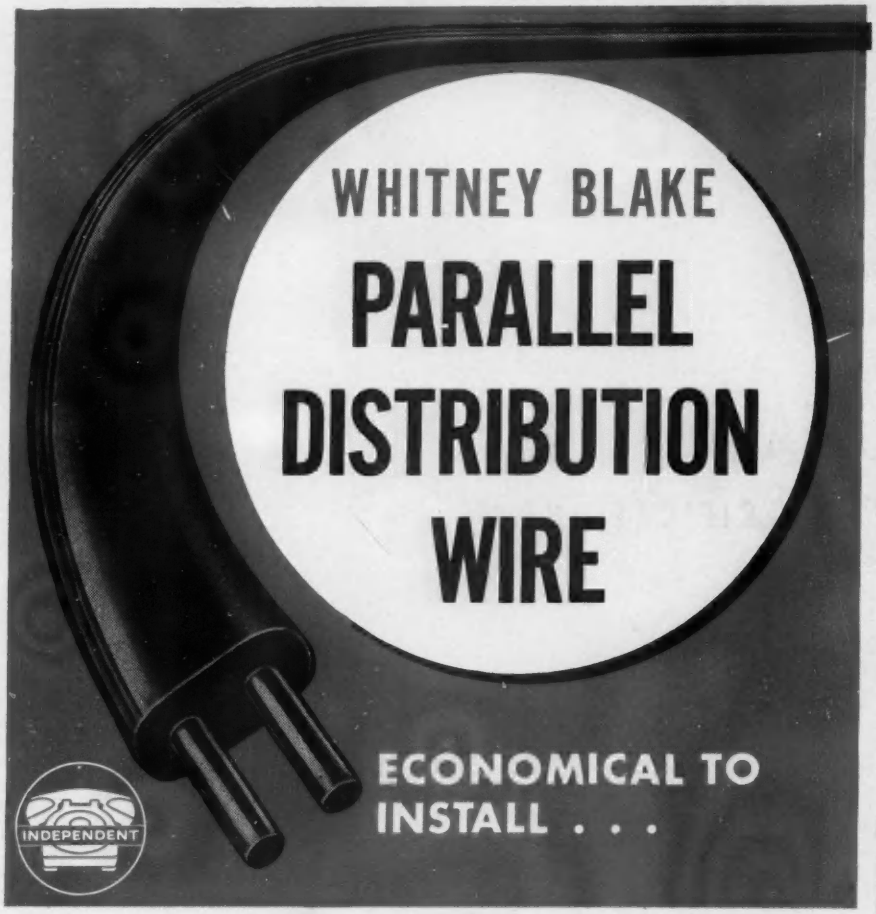
DIRECT BURIAL CABLE

TO R.E.A. PE-23 SPECIFICATIONS

For information on our complete line of plastic insulated telephone wire and cable — write for new catalog



THE REX CORPORATION
West Acton, Massachusetts



A minimum of labor is involved in installing WB Parallel Distribution Wire. It is ideally suited for long span construction. The high molecular weight polyethylene jacket is unaffected by adverse atmospheric conditions and also protects against transmission interference caused by tree branches, kite strings and other foreign objects falling across open wires.

WB Parallel Distribution Wire is made to the same high standards of quality that have maintained Whitney Blake leadership in the Independent Telephone Industry.

(Continued from page 14)

not to find itself in an extremely severe financial hole.

As to a House-originated excise reduction or repeal bill, Rep. Mills declared in a recent talk that "As to tax rate reduction, at the moment, I cannot see it in the picture during 1959. Tax reduction, as such, consistent with economic stability, should be deferred until budget surpluses can be more accurately foreseen."

At the same time, giving his long-range view of the tax problems confronting the nation and the need for a general tax system overhaul, Rep. Mills remarked that "Unfortunately, a vast number of the World War II provisions enacted in that climate (need to finance the war) are still on the books. This means that our present tax laws, to this extent at least, may be, and in my opinion are, out of step with our peacetime cold war economy of today . . . I am convinced that our war-engendered tax system has contributed materially to many of the present difficulties in specific industries and is having an effect on employment, economic stability, and growth."

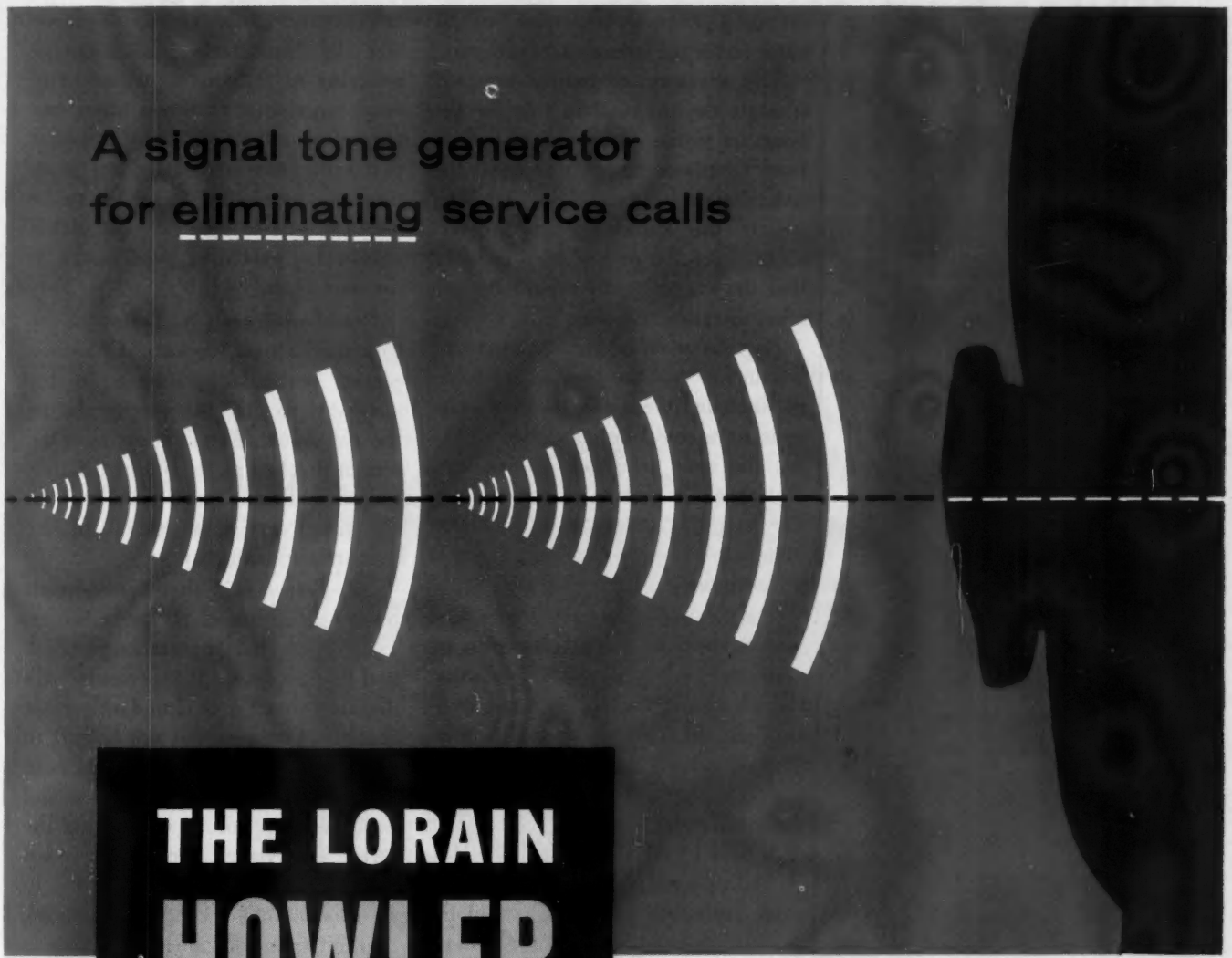
Excise Transfer Plan Termed "Not Feasible"

ONE EXCISE tax problem appears to be solving itself — the plan of the Federal-State Action Committee to transfer some federal spending authority to the states, and transfer at the same time part of local telephone excise revenues to finance the federal programs.

In the past, most of the opposition to the program has come from the standpoint of telephone companies and users, who would not like to see the telephone tax imbedded in the nation's revenue structure by its adoption in the states, and from the viewpoint of the states themselves, since many of them would come out on the short end of the deal from a revenue point of view.

But the grave of the program has been dug still deeper with release of the report of the Surgeon General's Water Pollution Control Advisory Board. Stream pollution expenditures would be one of the two federal

A signal tone generator
for eliminating service calls



THE LORAIN HOWLER

Write for Bulletin 167A

THE TONE THAT HANGS THE PHONE

The Lorain Howler's unique tone can't go unheard, can't be mistaken for any familiar sound. It begins softly on a high note, gradually declines in pitch while it increases in volume. It covers the full frequency range where both ears and receivers are most sensitive.

SAFE FOR EAR, SAFE FOR EQUIPMENT

The slow increase in signal volume allows plenty of time for removal of the receiver from the ear. And the Howler's distinctive tone can be sent out at a much lower voltage than is customary, protecting against damage to receivers or cable cross-talk.

EASY START, AUTOMATIC STOP

The Howler is plugged into the line at the protector frame or test desk. A push-button or a remote key starts it. A relay automatically stops the Howler and restores the line to service when the receiver is replaced. AC and DC input. Signal output: 0—40 volts, 2.5 watts.

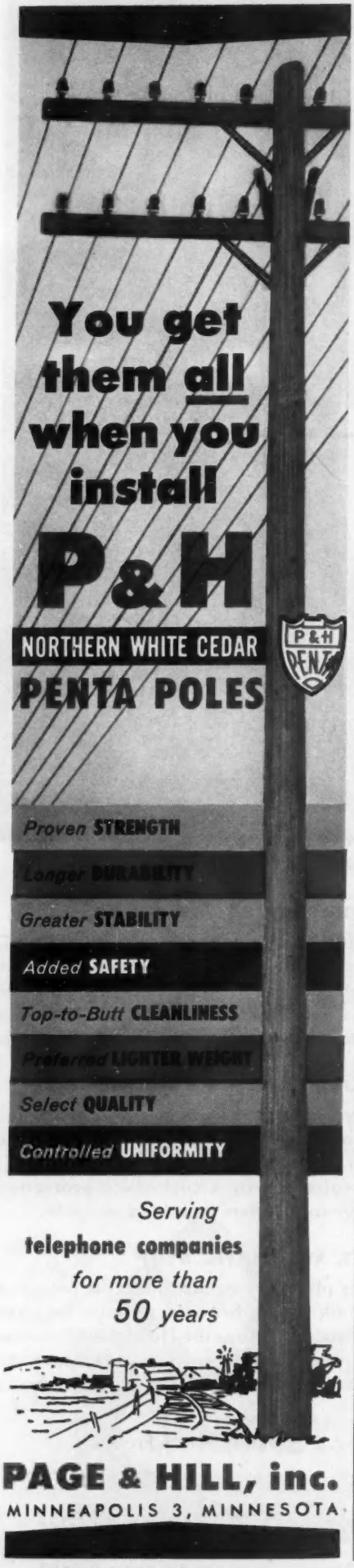
THE ONLY COMPLETE LINE OF POWER EQUIPMENT FOR COMMUNICATIONS

our equipment is sold through leading telephone distributors

FLOTROL SUB-CYCLE

LORAIN Products Corporation

1122 F Street Lorain, Ohio Phone: ATlantic 8-9191



spending programs transferred to the states under the federal-state program.

The advisory committee opposed strongly the proposal to transfer the program to the states, and finance it from telephone taxes. It rejected the federal-state plan as "not feasible, despite the knowledge and understanding on the part of each member that the current plan reportedly has administration blessing."

Reasons given for the "unanimous" conclusion that the plan is not feasible included the views that few state legislators could be persuaded to enact the state telephone excise, and that there "would be an unnecessary loss and dissipation of $60,000,000 of federal revenue annually, "even if all states enacted the excise.

The committee also reported a 48-2 vote against the federal-state plan by state and interstate water pollution control administrators and state sanitary engineers who answered a questionnaire.

Labor Legislation

ELSEWHERE on Capitol Hill, labor legislation is being considered, including proposals to end the present exemption from the federal minimum wage law for operators in telephone exchanges of fewer than 750 stations, unless the switchboard is located in the operator's residence.

Also on the docket is the labor reform measure offered by Senators John Kennedy (D., Mass.) and Sam Ervin (D., N. C.), and two statements from the telephone field have been transmitted to the Senate Labor & Public Welfare Committee on that subject.

President Ben S. Gilmer of the Southern Bell Telephone & Telegraph Co. has urged Congress, in his statement, not to combine legislative proposals relating to various internal operations of labor unions with "proposals to change the basic law of labor-management relations."

Mr. Gilmer also dealt with proposals in the bill to change the definition of a "supervisor," and he declared that "in the 11 years during which the Taft-Hartley Act has been in force," its definition covering supervisors has "operated reasonably successfully." Mr. Gilmer declared that the "introduction of language referring to individuals whose principal function is to direct other employees is ambiguous ,and if it means that some measurement, either as to time or some other factor, is to be used, it fails to take account of the reason for excluding supervisors in the first place."

President Joseph A. Beirne of the Communications Workers of America placed particular emphasis in his statement on the proposals to change the definition of supervisor, with the aim of precluding the National Labor Relations Board from including the job title "service assistant" in the "supervisory category."

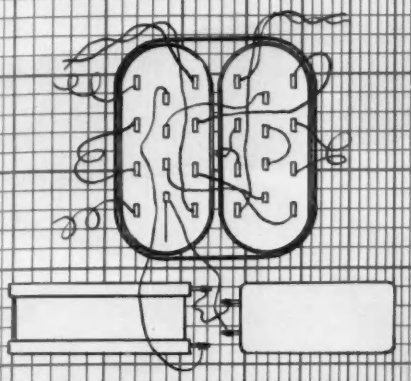
Mr. Beirne said that "amendment of the definition of the term 'supervisor' is of vital importance to CWA and the employees it represents." He declared that "it is abundantly clear that the Congress did not intend to exclude from a recognized bargaining unit a part of an employer's actual basic working force" in defining the term "supervisor." Mr. Beirne added that the "definition was intended to be limited to bona fide supervisors, and not to include such employees as straw bosses or leadmen, and I submit, not to include such persons as 'service assistants' . . ."

Minimum Wage Boost

IN ANOTHER development in the labor field, a five-cent hourly increase in special minimum rates under the Fair Labor Standards Act for learners in the Independent telephone industry has been announced by Clarence T. Lundquist, Administrator of the US Labor Department's Wage & Hour and Public Contracts Divisions.

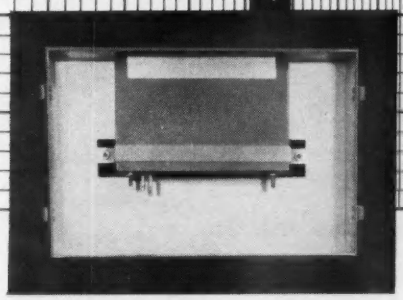
Effective March 30, for exchanges of fewer than 3000 stations, a minimum hourly wage of 85 cents will replace the present 80-cent rate for the first 240 hours of the learning period, and a 95-cent hourly minimum will replace the current 90-cent rate for the remaining 240 hours. For exchanges of 3000 telephones or more, the present 85-cent hourly rate will be boosted to 90 cents for a total 240-hour learning period. — *Roland Davies and Fred Henck.*

Acceptance tests are simpler, quicker with Airtronics PORTABLE Test Hybrid



NO MORE OF THIS

WITH THIS!



Provision is made for carrying a spare network in the cover.

Portable and DURABLE

Airtronics Portable Test Hybrid is built to withstand the rough handling of normal testing operations. Rugged construction throughout, and housed in heavy-gauge aluminum travel case with handy carrying handle.

Dimensions 8" x 9" x 12"
Approximate Weight 14 lbs.
Economically Priced at $235.00
FOB Ft. Lauderdale, Fla.

TRANSMISSION ENGINEERS and TESTERS:

Here is a test set designed especially for you! A precision test hybrid, packaged for flexibility and convenience. Give your test results the advantage of precision equipment designed for reliability and consistency:

Airtronics Portable Test Hybrid is designed to use standard type 115H or 115AL Precision Networks which are available in all toll offices.

HERE ARE A FEW OF MANY USES:

Cable acceptance tests.
Trunk acceptance tests.
Circuit evaluation.
Direct reading capacity bridge.
Any of the above tests using Singing Point or Return Loss techniques.
(Specialized applications will suggest themselves to you.)

CHECK THESE SPECIFICATIONS

120 P Repeat coil hybrid, specially adjusted for high trans-hybrid balance.
128 type low pass filter.
Precision 1% capacity decades on NBO.
Internal switching provided for two most commonly used networks.
Plug-in network arrangement, compromise net built in.
Line and Net simplex leads brought out to pin jacks on front panel for special testing procedures.
Convenient panel lay-out, jacks and binding posts to facilitate connection to line or external circuits.
600 ohm impedance on 4 wire legs.
900 ohm impedance on line, (simple wiring change for 1500 ohm impedance line).

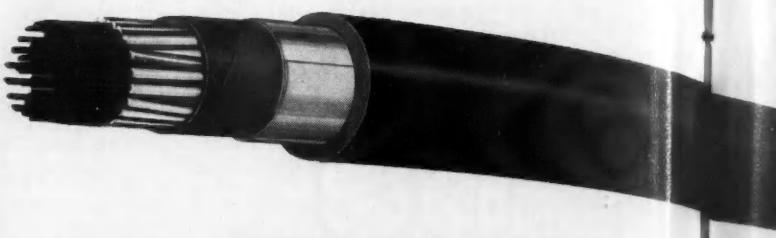
Modernize your testing procedures with the new **AIRTRONICS PORTABLE TEST HYBRID MODEL 20B**
Precision Network available

A PRODUCT OF

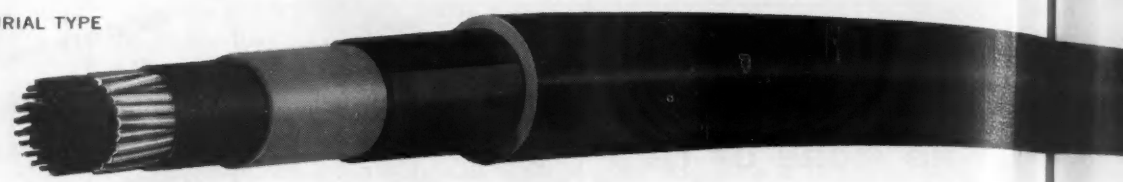
AIRTRONICS INTERNATIONAL CORPORATION

P.O. Box 8576, Fort Lauderdale, Florida (6900 West Road 84)

AERIAL AND DUCT TYPE



DIRECT BURIAL TYPE



PHELPS DODGE TELEPHONE WIRE AN
THE "MINE-TO-MARKET" QUALITY LI

Exchange Area Telephone Cable

This Phelps Dodge cable, designed for aerial, duct and direct burial use, has a lightweight, thermoplastic construction—including fully color coded conductors—that makes handling easier and cuts installation time.

Exceptionally fine electrical properties and superior resistance to moisture, weathering and abrasion are assured through the use of highest grade materials, skilled workmanship and manufacturing experience.

The controlled craftsmanship and high quality of Exchange Area Telephone Cable are typical of the entire line of Phelps Dodge telephone wires and cables including:

- Self-Supporting Telephone Cable
- Rural and Urban Distribution Telephone Wire
- Interior Telephone Cable
- Rubber-Insulated Lead-Sheathed Telephone Cable
- Paper-Insulated Lead-Sheathed Telephone Cable
- PD-Tel Wire

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E AND CABLE

Y LINE!

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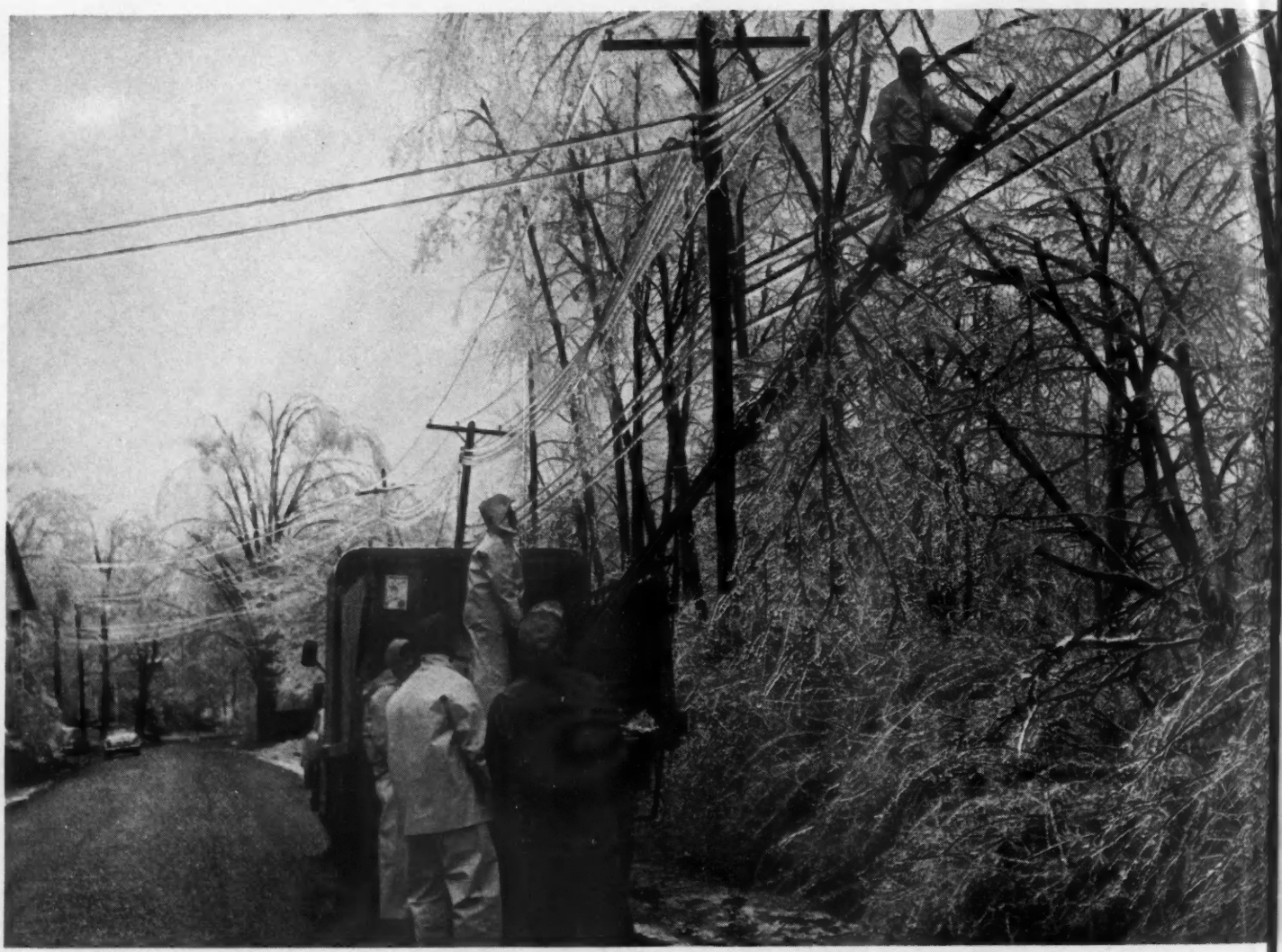
CORPORATION

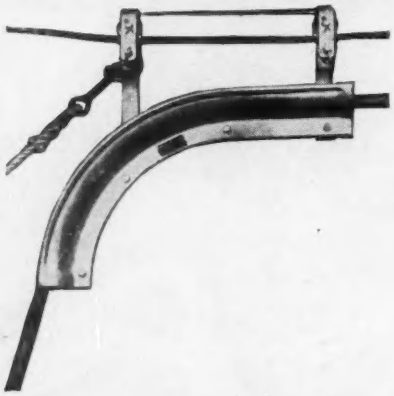
SALES OFFICES: Atlanta, Birmingham, Ala., Cambridge, Mass., Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Detroit, Fort Wayne, Greensboro, N.C., Houston, Indianapolis, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

PD

Kellogg rescues ice-struck



Cook Battery Charger—furnished in 1½ amp. 1-phase, 24 amp. 1-phase, and 25 amp. 3-phase models. Sturdy steel cabinets; all designed for long trouble-free service. COOK ELECTRIC COMPANY.



Cable Placing Shoe—used for guiding cable in raising the cable from the reel to the strand. Strong but light in weight—made of cast aluminum with steel arms and rollers. Locking pins keep shoe on strand. Made by CABLE SPINNING EQUIPMENT COMPANY.

This Cook Stranterm is available in 6, 11, and 16 pair. The only strand-mounted Cable Terminal designed for a flexible system of Minigap or Mytigap protection. Supplied with lead sheathed cable stub. COOK ELECTRIC COMPANY.

independents

Ice-laden wires spell trouble for telephone men. Kellogg can't make the work any easier, but Kellogg can simplify your repair and supply problems when such emergencies strike.

At all eight strategically-located Kellogg warehouses you'll find complete stocks of more than 12,000 vital items waiting for just such crises as faced Newton, New Jersey, after a severe ice storm. These close-at-hand facilities do much to alleviate subscriber inconvenience, hold it to a minimum, and allow repairs to proceed quickly.

Whether or not your needs are brought on by an emergency, you'll find Kellogg a good place to do business. The experience gathered in more than 60 years of association with independent telephony is always at your service. And you have the added assurance that everything you buy from Kellogg is backed both by Kellogg and the world-wide resources of International Telephone and Telegraph Corporation.

KELLOGG Communications Division of ITT
CHICAGO, ILLINOIS

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Illinois
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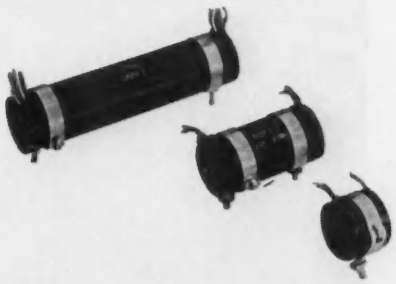
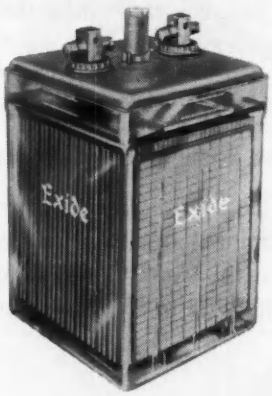
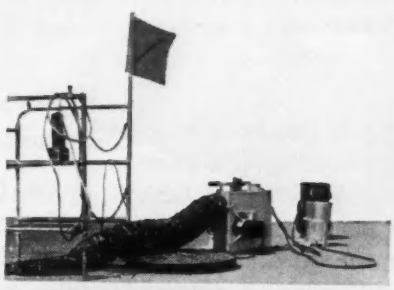
The Time-Tested Steel Strand. A ductile, adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection against corrosion in INDIANA STEEL & WIRE COMPANY'S Crapo Steel Strand. Minimum maintenance expense.



CEECO Type C152 Ready Mount Loading Coil Assemblies, with C651 (44MH) or C652 (88MH) coils. Coils are encapsulated in plastic (moisture free). Size and weight reduced, yet with same or better electrical characteristics. Ready Mount Straps (sold with or without straps) for mounting in Splice Cases or Terminals. Can be installed directly into cable. Available with 1 to 26 coils. COMMUNICATION EQUIPMENT & ENGINEERING COMPANY.



New safety against explosion. Model EWA Exide-Tytex Batteries now feature a special explosion-control gas venting device for extra safety. Other advanced features include suspended plates, patented Silvium corrosion resistant grids, plastic jars. Exide Industrial Division, THE ELECTRIC STORAGE BATTERY COMPANY.

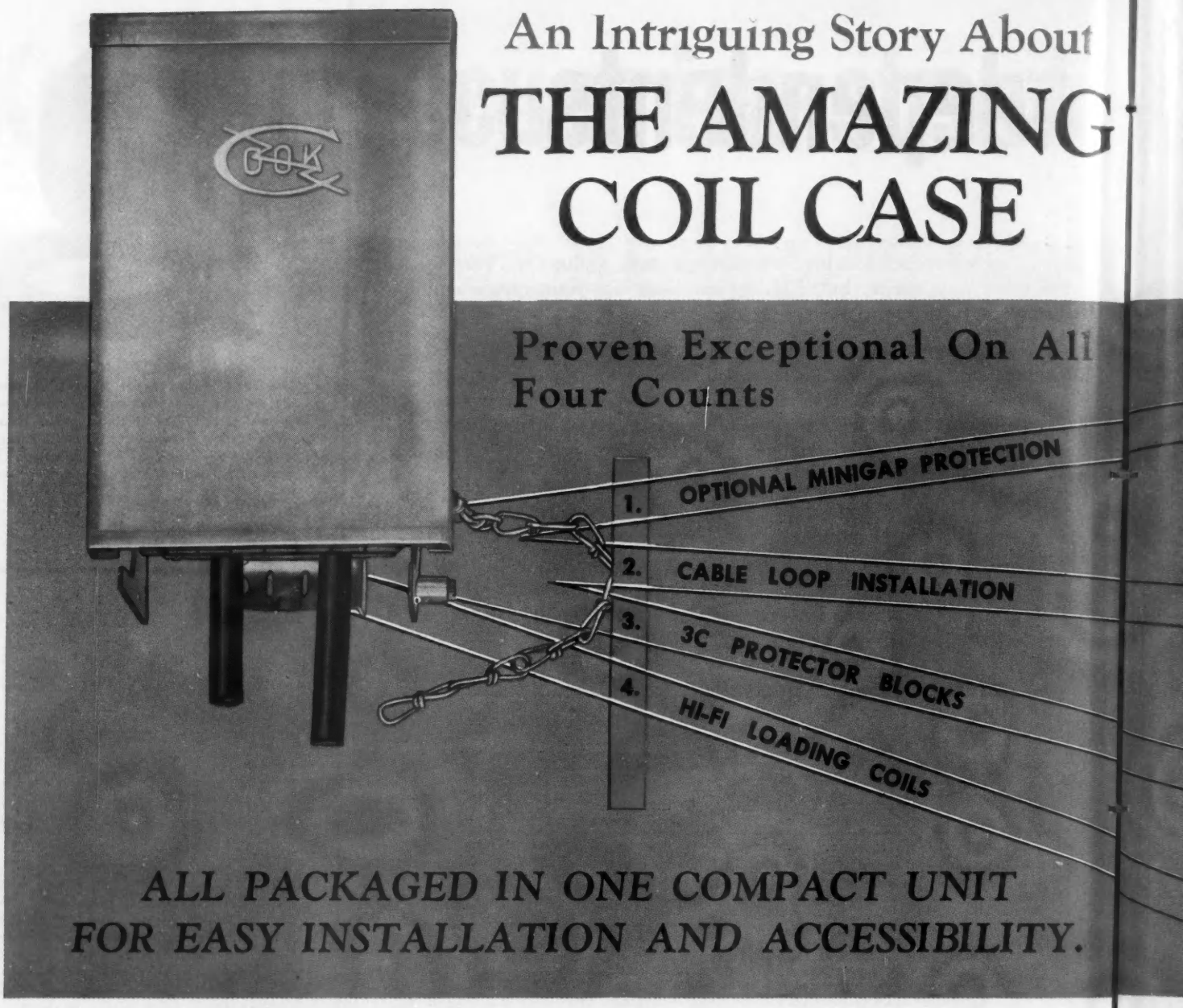


McPeCo Model PE-G Ventilating Heater and Attached Generator—An aid to safe utility, construction and maintenance. Clears manholes of explosive gases, as well as furnishing an ample supply of fresh, heated air for all underground work. Portable, weighs only 78 pounds, with attached 300 watt DC generator providing current for a drop cord and electric light.
MORRISON-PELSUE COMPANY

Sub-Cycle RT Units combine into one compact unit, both ringing and talking power supply. Models available for 6, 12, 24, and 48 volts d-c supply. Also T-units for superimposed ringing and power for pay station coin collect and return. Five cabinet sizes. LORAIN PRODUCTS CORPORATION.

An Intriguing Story About

THE AMAZING COIL CASE


COOK
Proven Exceptional On All Four Counts
1. OPTIONAL MINIGAP PROTECTION
2. CABLE LOOP INSTALLATION
3. 3C PROTECTOR BLOCKS
4. HI-FI LOADING COILS
ALL PACKAGED IN ONE COMPACT UNIT
FOR EASY INSTALLATION AND ACCESSIBILITY.

The recent Cook Loading Coil Case has solved mysteries in loading coil installation and protection. Investigation will show evidence of up-to-date terminal blocks with optional Minigap protection and loading coils mounted to meet the customers particular requirements.

In reviewing this case the loading coils have been found to reduce attenuation, combat frequency distortion and avoid cross talk on existing lines. It has been proven beyond any reasonable doubt that 3C protector blocks assure moisture proof termination; and furthermore, the Minigap optional protection will give extra economies by protecting cable pairs selectively.

The Cook Loading Coil Case is made up of a heavy galvanized steel frame, with deep drawn chamber for cable loop through. To cover this case a welded zinc cover is used. Every case has grounds for extra protection.

The Cook Coil Case is made in 6, 11, and 16 pair and the loading coils have a nominal inductance of 88 MH.

In the opened and closed case shown here, all the evidence is clearly pointed out to prove without a reasonable doubt that the Cook Coil Case can guarantee performance, holding to all proved and established standards.

See Your Local Distributor Today

COOK ELECTRIC Company

Since 1897

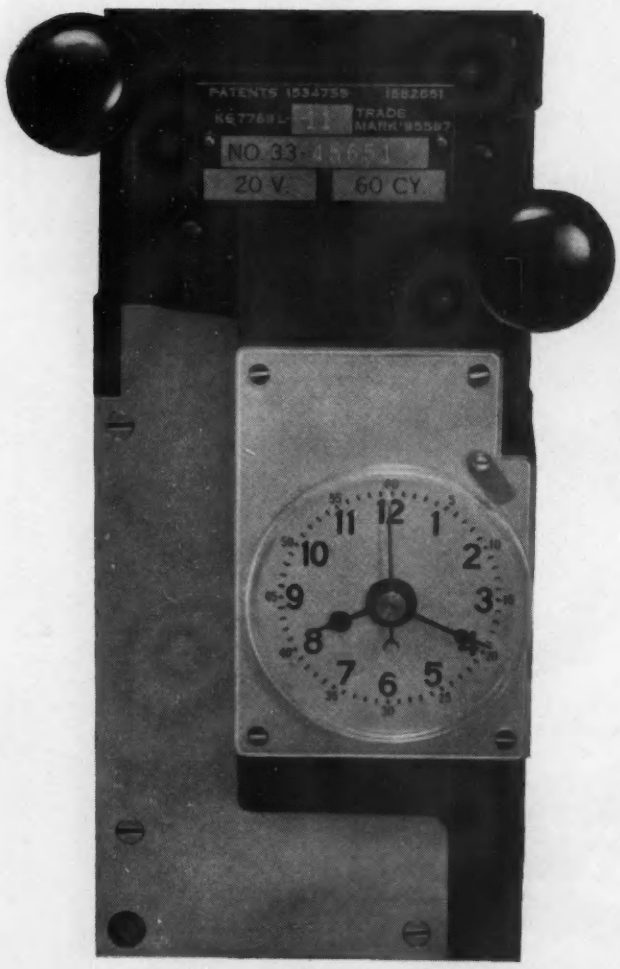
2700 SOUTHPORT AVENUE CHICAGO 14, ILLINOIS

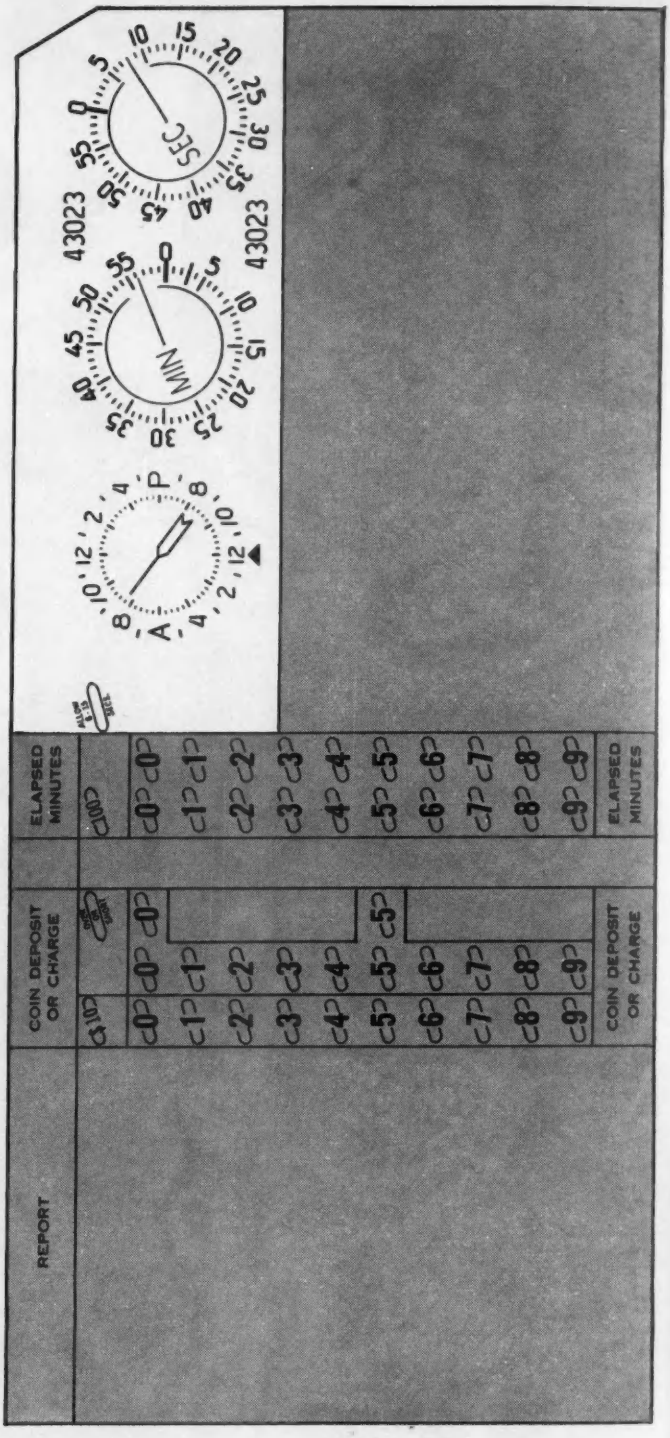
CALCULAGRAPH IS READY FOR MARK SENSING NOW!

If you are planning to use mark sense toll tickets now (or later) be sure your Calculagraphs are readily adaptable. Remember to do these three things now —

1. When ordering new Calculagraphs specify "set back" handles—this feature clears the way for mark sense toll tickets (or ANY SIZE ticket in fact).
2. Plan a program of modification of Calculagraphs now on your switchboard.
3. If you are still using the old round-type Calculagraphs, consider the economics of replacing them with the new space-saving Model 33 that will include all the latest improvements—set back handle, color-coded handles for easier operation and 60-minute dial to assure 100% accuracy on all calls.

If your analysis shows that mark sensing makes sense economically, or your present system requires a larger size ticket, consult your Calculagraph distributor today. Ask him about the set back handle feature as well as other modernization features of the NEW Calculagraph.





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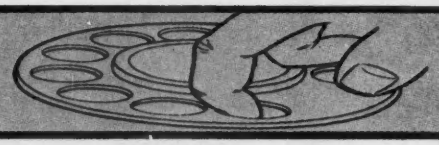

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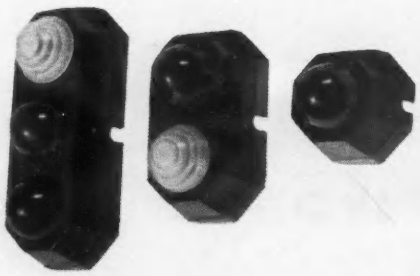

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SE 15	Indicator Light	(1 lamp)	$2.30
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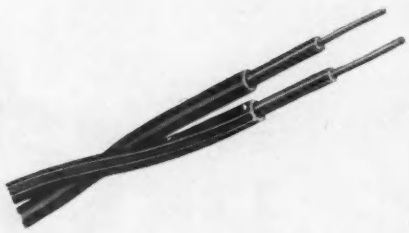

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For connecting open wires together or to cable terminals, **DIAMOND WIRE** offers its neoprene covered Bridle Wire. This rubber insulated, soft tinned copper wire offers exceptional strength and holding power. The neoprene insulation is permanently welded to the conductor. All types of **DIAMOND** Telephone Wire are stocked by **SUTTLE** in quantity and usually can be delivered immediately. Check **SUTTLE's** prices!

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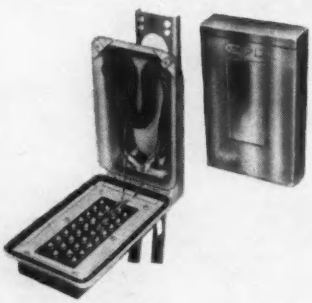

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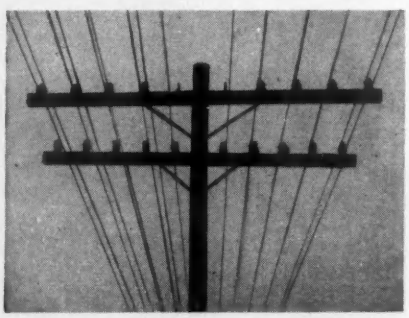

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EDITORIAL

"Accent On Management Development"

SINCE 1956, when the USITA Personnel Committee started a project aimed at the formation of a Management Development Program for the Independent telephone industry, we have repeatedly expressed our belief that the program should receive the hearty approval and backing of all industry members.

Many others shared that belief and gave their support to plans that resulted in USITA holding its first Management Development Program at the University of Kansas last year.

The success of the 1958 program is best proved by: (1) the fact that participants have been fluent with praise and expressions of appreciation for the program, and (2) before the USITA Personnel Committee could release information on the 1959 program, enrollment applications had been received from representatives of several companies represented by enrollees in the 1958 program.

Such reaction is all to the good. And we hope the reaction of industry members to an important mailing made last month by the USITA Personnel Committee will far surpass that shown last year.

In brief, the recent mailing advised members of the Independent telephone industry that USITA's 1959 Management Development Program will be held at the *University of Kansas* from *July* 12 to *August* 7, 1959, and listed these main features of the 1959 program: —

(1) The program's basic objective is to help Independent telephone executives prepare themselves for effective managerial leadership.

(2) The program is not designed to develop technical specialists. However, each participant will have the opportunity to learn about specialties other than his own. By this process he is also expected to gain perspective on how his own particular function fits into the entire company's operations.

(3) The type of development offered by the program requires diligent effort and relatively undivided attention on the part of the participants. In choosing to have the program on a University campus the Personnel Committee not only sought to make use of educational facilities and faculty but also to provide telephone executives with the opportunity to leave behind the pressure of their daily duties and enjoy an environment in which study and learning are the principle objectives.

(4) The program is designed for executives who currently have important administrative responsibilities. Therefore, rather than a list of separate courses the program is a single course having three areas of development: (1) *The Functions of Administration;* (2) *The American Business Climate,* and (3) *Rate Regulation.*

All in all, as we see it, these features of USITA's 1959 Management Development Program will do these important jobs for each industry member who journeys to Lawrence, Kansas, and attends the sessions at Kansas University: —

(1) Broaden his point of view beyond any organization function in which he currently finds himself.

(2) Bring about: (a) a fuller understanding of the problems of other executives and their activities; (b) a greater comprehension of the problems of financing a utility company; (c) a broader knowledge of regulatory problems, rate of return, and rate structure; (d) a knowledge of the interrelationship of business and government, business cycles, and general economics; and (e) an improvement of his understanding of the importance of the cultural, scientific, and political environment within which he must operate.

(3) Further his own development, improve his understanding of people, and develop his skill in getting things done through people.

These objectives, aimed at broadening thinking and outlook, increasing present effectiveness, and stimulating interest in further self-development, make the 1959 USITA Management Program have such possibilities that it is a "*Must*" for the Independent telephone industry.

P. S. *There is no better time than right now to fill out your application and return it to Dean J. R. Surface, School of Business, University of Kansas, Lawrence, Kans., or write R. J. Fegan, Chairman, USITA Personnel Committee, Junction City Telephone Co., Junction City, Kans.*

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2 communities in New York
2 towers by Blaw-Knox
22,000 served by Microwave

Rochester Telephone Corporation installed a microwave system to give better service to its present subscribers and provide for future expansion. Two towers, one astride the central office in downtown Rochester and another, roof-mounted on the Brockport, New York, office, provide toll circuits for 22,000 of the firms' 275,800 subscribers. Over-the-building installation demonstrates only one of the many ways Blaw-Knox towers adapt to plant location.

Like so many companies converting to microwave, Rochester Telephone Corporation chose Blaw-Knox towers. Forty years' experience building all types of towers has given Blaw-Knox the know-how needed to design to individual area requirements, engineer to established specifications and build for future adaptability.

Blaw-Knox's complete tower service includes adapting towers to sites, modern fabrication and experienced erection assistance. For more details, write for your copy of The Microwave Tower Booklet 2538.

BLAW-KNOX

BLAW-KNOX COMPANY
Equipment Division
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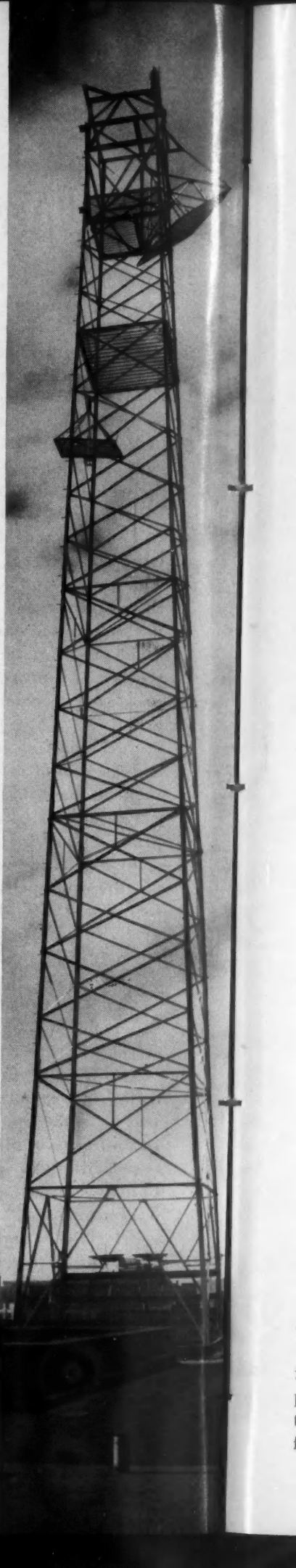

◀ 225 ft. Blaw-Knox Microwave tower at Brockport, New York

125 ft. Blaw-Knox Microwave tower at Rochester, New York ▶

ISAACK HERMAN, vice president and general manager of Secode Corporation sets the dial code on the Secode 49HS selector used in the prototype of the first central office dial terminal for integrating an automatic dial telephone system with the mobile telephone. Since this picture was taken, the dial terminal has grown into a production product. This one, however, is the original which started the dial-telephone-in-a car age. — (Photo by Cyril Jacques Glunk.)

1958—Busy Year For Electronics

By LEO G. SANDS

1958 was the biggest year yet in the expansion of the semi-conductor art. Many new types of transistors were introduced and many new products utilizing transistors were introduced.

VISITORS to the 1958 New York Business Show could easily tell what was of most interest to the public as exemplified by the executives, their wives, their secretaries and other office workers who attended the show. The show stoppers were the various telephone exhibits. Almost everyone stopped at the North Electric booth to look at and try out the various colored Ericofons. Bell attracted them with live talent, including pretty girls, plus the new "Call Director" push-button telephone. Tele-Norm drew the crowds with its beautifully styled push-button inter-office telephones.

The announcement of the development by Secode of devices which permit extension of dial telephone service to automobiles was heralded in newspapers as far away as Tokyo, Japan and evoked a retort from Russia in the form of a news photo release showing their vision of a vehicular dial telephone.

The public is very definitely telephone conscious. But, under the surface, where the public cannot see and would not understand the meaning . . . is where the real telephone news was made in 1958. Much of the progress has been noted in the business and technical press, but in small doses at a time.

1958 was the biggest year yet in the expansion of the semi-conductor art. Transistors now more than 10 years old, were improved, many new types were introduced and many new products utilizing transistors

were developed. The transistor, which was created within the telephone industry, is being utilized in Lenkurt carrier equipment in lieu of tubes and in a new 1000-cycle test signal generator developed by General Telephone for distribution by Automatic Electric. General Electric and RCA and Motorola introduced all-transistor mobile receivers. Automatic Electric introduced a loudspeaking telephone set utilizing a transistor amplifier, the type 88T. Secode engineers developed an experimental all-transistor digital dial pulse decoder which does the work of several stepping switches without using moving parts.

Of great significance are the developments made in electronic switching. Stromberg Carlson developed an electronic switchboard for the Army. *Fortune* magazine,

The latest in mobile radiotelephones is demonstrated here by JEAN ALBORA, star of opera and the concert stage. The set which fits so neatly behind the driver's seat of a Mercedes Benz is the Kaar TR325, the smallest 25-50 mc band mobile on the market. The antenna at the center of the radio is the new Tele-Beam Magic Wand.

in its January issue, predicted that the all-electronic telephone switchboard will be a commercial reality in the early 1960's and even, perhaps, sometimes in 1959. While electronic switching can be done with tubes, it is the transistor and its related diode around which electronic switching systems will be designed. Bell Labs last August announced the development of a switching diode which operates in one milli-microsecond and has a life expectancy of some 100,000 hours.

Transistors have already become standard in mobile telephone equipment power supplies, replacing short-lived vibrators as well as dynamotors. Transistors not only last longer and are more efficient, but unlike vibrators they start functioning when vehicle battery is low. This means that mobile telephone subscriber equipment maintenance costs will be reduced and more customer satisfaction will be produced.

The cost of equipment using transistors was reduced sharply in 1958. These cost reductions were made possible by larger volume production and improved techniques as well as the effects of competition. In the home radio field, for example, transistor radios imported from Japan are available at about half the cost of American made equivalents. Even in the hearing aid field, this foreign competition is being felt. The Japanese all-transistor hearing aids are being sold here for as little as $19.95 in competition with domestic types selling from $100 to $300. Examination reveals that these products are of good quality.

Microwave Developments

EXPANSION of circuit capability was the most emphatic development in microwave systems. Where the ceiling for most non-Bell equipment was 24-36 voice channels, stress is being placed on systems capable of several hundred voice circuits. Collins, for example, provides microwave systems which can be expanded from as little as one voice channel to 240 voice channels.

Considerable progress was made in the development of microwave tubes as well as the maser, a solid-state source of microwave energy. The traveling-wave tube (TWT) has been heralded as the device which will enable the design of simpler microwave repeaters. The TWT was much improved in 1958 by the work of such scientists as Wilson S. Geisler, Jr., and such firms as Eitel-McCullough, which brought out a more durable TWT employing ceramic construction.

Varian Associates, whose founders Russell and Sigurd Varian invented the klystron tube, introduced a new wide-tuning-range klystron which provides sufficient bandwidth for several hundred telephone circuits. And, the basic concepts of a new tube were expounded by Mr. Geisler, who dubbed it the "spere-o-tron."

In 1958, Lenkurt expanded its microwave product line when it introduced large-capacity 6000-megacycle microwave systems. And for the future, Philco's "Hill-Hopper" microwave system, designed for the Armed Forces, has interesting telephone service implications. Capable of handling 96 telephone circuits, the new Philco system is intended for single-hops ranging from 5 to 100 miles, without requiring repeaters. At year's end, Raytheon announced a new 6000 mc microwave system for telephone application.

Mobile Telephone Developments

THE ALL-TRANSISTOR receiver is perhaps the most significant mobile telephone development made in 1958. The use of transistors reduces average power requirements to a mere fraction of what they were. No longer are oversize charging generators a requirement for vehicles equipped with mobile telephones. Tubes are still used in transmitters and their power requirements are still high. But, the transmitter is used only a few minutes per day in most cases so the heavy but unsustained drain of the transmitter should have no adverse effect on the battery. Stand-by drain can be

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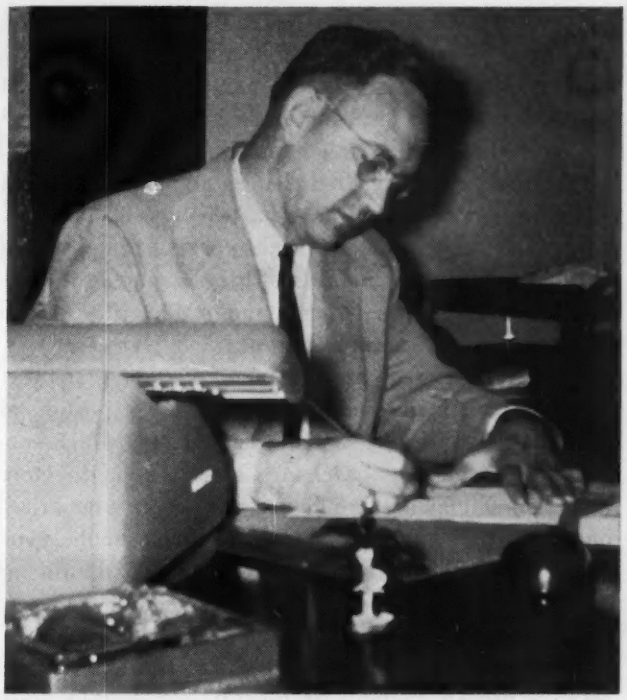
"Pro's" and "Con's" of CYCLE BILLING

By B. W. BARNETT

TODAY, cycle billing is proving in as the proper answer to several management problems. Here are the advantages, some of the disadvantages, and a summary of the results obtained by Texas Telephone & Telegraph Co.



The author, B. W. BARNETT, is general auditor, Texas Tel. & Tel. Co., Corsicana, Texas.

RECENTLY the writer received, about the middle of the month, a bill from a large department store. At the top of the bill was the notation, made by a machine: "Cycle 2 — Close 8-10-58."

Although not nearly all business concerns which use cycle billing reveal the fact by such a notation, cycle billing has today come to be widely used as the answer to several problems of good management. This article's purpose is to discuss some factors in this practice, some advantages and some disadvantages of cycle billing, and some of the results.

It is a well known fact in the telephone industry that the accounting personnel and their work, regardless of the size of the company, have a marked effect on customer relations. A subscriber may have personal knowledge of the plant department only the one time when the installer connects the instrument. Unless he makes or receives a substantial number of toll calls, subscriber contact with the traffic department is small.

As the use of Direct Distance Dialing increases, this contact with the Traffic Department will be even less than now. If the subscriber pays his bill by check, he has no direct contact with the Commercial Department. But each month he receives his bill from the Accounting Department. Not only is the arrangement and size of that bill a factor in customer relations; the time of the month and the regularity of receiving the bill are also important to both company and customer.

Some time ago, for example, as a part of the necessary re-arranging which a growing company experiences, all the billing for subscribers in an entire district of the company with which the writer is connected were moved from one cycle to another. Unfortunately, the subscribers had been getting their bills at the end of the month for many years, and according to our district manager, his collection system was based on this fact. Although we were successful in moving the bills in that cycle to be mailed on the 10th of the month, only the full co-operation of our Commercial Department enabled us to make this change without serious damage to our customer relations.

"Growth Means More Billing"

ONE OF THE characteristics of the modern telephone industry is growth — in many places rapid growth. One of the immediate and easily recognizable results of this characteristic is a corresponding increase in billing work. This increase in billing work, when its permanent character is recognized and accepted, is usually solved in one of two methods: (1) additional or more highly developed machinery, or (2) more efficient methods and procedures. Often this added billing work demands both, if accounting costs are to be kept from becoming excessive.

If the management of a company with such a problem can handle such an added growth in billing work by improved methods and procedures, and thus avoid investing in costly machines, a considerable saving can result. Cycle billing holds out such a solution: this is a reason for its growing popularity.

Persons experienced in office management know that savings in filing, preparing forms, and other details of office procedures can make a surprisingly large difference in the number of personnel needed in an office. Cycle billing helps bring these savings because filing does not stack up and accumulate when billing is done by cycles, in the same degree that it does otherwise. New records for a new month can be set up as the

work is done, rather than being done all at the end of a billing period. What office machinery is already on hand can be used to the maximum degree when the work is spread out as in cycle billing, as it is used during *all* the month, rather than just at peak periods.

It should be remembered that an important function of the accounting personnel of a telephone company is to provide management with accurate, prompt, and detailed information. Another of the advantages of cycle billing is that accurate, prompt, and detailed information can be more easily supplied.

It takes longer to prepare summaries and analyses of an entire system than it does for only a portion of it. If all the types of telephone services, for which subscribers are billed — exchange service, toll, directory advertising, unpaid accounts, etc. — are summarized only once each month and made available to the management, important changes may take place within the month which would not be revealed soon enough to take corresponding action.

Sudden increases or decreases in toll traffic and revenue are an example of this. It is true that much of this type information may be gained from other reports, such as daily cash reports, station reports, etc. These usually are reports for the entire system, however, and do not indicate fully and exactly where the fluctuations are taking place.

When cycle billing is used, however, and the cycles are arranged by administrative districts or some other arrangement corresponding with the general management of the company, more up-to-date and definite information is available from reports and summaries of each cycle with the resulting advantages.

CYCLE BILLING TIPS

(1) The two main advantages of cycle billing are: (1) the billing work is spread out more evenly over each month, thus reducing rush periods or slack periods in the accounting department, and avoiding or minimizing the addition of costly machinery; and (2) management receives faster reports on toll revenues, exchange revenues, and collections.

x x x

(2) Cycle billing can only go so far in keeping billing work evenly scheduled. It can get it approximately so and no more.

x x x

(3) Billing personnel must be well briefed on scheduling to avoid costly delays in work.

x x x

(4) The use of cycle billing requires careful management. If careful forethought and coordination of work is present, cycle billing can improve the accounting job and reduce expenses.

These then, are the two main advantages to cycle billing: (1) the billing work is spread out more evenly over each month, avoiding rush periods and slack periods in the accounting department, and avoiding or minimizing addition of costly machinery, and (2) quicker information, particularly on toll revenue and collections of subscribers' accounts, is made available to the management of the Company.

Impressive and desirable though these two advantages may be, it is well to remember, on the other hand, that there are also disadvantages to this method. Before cycle billing is adopted, it is well to weigh carefully these disadvantages.

Reference has already been made to the effect of cycle billing upon customer relations and to the effect of receiving a bill at what, to many subscribers, may seem an unusual time of the month. This is particularly true in smaller towns which may not be accustomed to modern business methods.

For all new subscribers, it is necessary, when cycle billing is followed, to enclose with the first bill a statement explaining what period is covered, and what is the regular billing period. Our billing statements contain the following notation at the top: "Local service charges in advance for one month from date of bill. . . ." Such steps, some of which would not be necessary if cycle billing were not used, are necessary to avoid customer confusion.

This "information and education" process, of course, must be carried further with all commercial personnel, in order that they fully understand all cut-off dates.

This article began by making reference to the cycle billing used by a department store. One big difference between the billing of a department store and the billing of a telephone company is the number of elements involved.

The department store ordinarily has two elements: merchandise sold and amounts paid on account by the customer. (A department store may have special situations such as "lay-a-way," just as a telephone company may have charges for special equipment, fractional charges and credits, etc.)

The telephone company's billing, however, is complicated by the fact that billing for local service is *in advance* from date of bill, whereas toll billing is *in arrears*, dating back to some date even earlier than the date of the bill. Directory advertising, if done on a monthly basis, is in advance also.

These factors are mentioned because, when commercial personnel discuss a subscriber's bill with him and local service is dated *in advance* from the 20th of the month and toll billing is for one month *in arrears* up to the 10th of the month, confusion develops much more easily than it would on a "straight month" basis. Add to this a mid-month cut-off date used for collections credit, and a situation made-to-order for misunderstanding and dissatisfaction exists!

Within the Accounting Department, similar complica-

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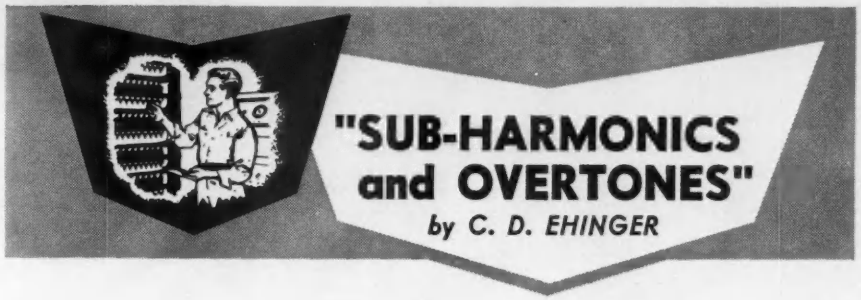


"A 'Build-It-Yourself' Instrument"

FROM THE TE&M Laboratory comes this report on building a vacuum tube voltmeter for the equipment room by following the instructions of the kit manual to the letter.

IT IS VERY difficult for me to understand the reason for an odd situation in the telephone industry. I imagine that you have encountered. at one time or another, the paradox of the telephone company with "missile-age" central office equipment and "horse and buggy" maintenance tools and equipment. There are also a number of telephone companies that are equipped with excellent outside-plant tools but are attempting to have their inside-plant maintenance men service and maintain today's modern equipment with nothing more than a screwdriver, a pair of long-nose pliers, and a cheap dc voltmeter.

If you doubt that such situations actually exist — rather generally in the entire telephone industry — just ask the first central office maintenance man you encounter. Ask him whether he feels that he has been supplied with all of the tools and test equipment which will allow him to do the best job in the least amount of time at the lowest possible cost.

The Author, C. D. EHINGER is president of Citizens Tel. Co., Decatur, Ind.

I may be as wrong as a three-dollar bill, but I'll wager not one out of 10 will reply in the affirmative. To add to the ridiculous aspect of the situation, the entire cost of an adequate supply of test instruments represents only a very small fraction of the investment required for today's complicated central office equipment.

"The Vacuum Tube Voltmeter"

LET'S MAKE an investigation of the initial investment, performance, and other aspects of the "work horse" of any telephone equipment room — the vacuum tube voltmeter.

Since the "kit" type of instrument has become so popular, and prevalent, in all of the various electrical and electronic fields, arrangements were made with Allied Radio Corporation to furnish its printed circuit vacuum tube voltmeter kit. The unit arrived by parcel post and was in excellent shape with no damage from shipment. Packaging is extremely compact and sturdy and the various components are shown in their original packing, less filler, in *Illustration A*.

Long ago I lost track of the number of instruments I have fabricated, either from the kit form or from "building from scratch." I have also learned, from my own experience and from correspondence and conversation with suppliers, that even the most experienced technician will have a better instrument, and perform a better job, by following the instructions of the kit-manual to the letter.

The instruction and assembly man-

ILLUSTRATION A: — Components are neatly and securely packaged. All resistors are separately identified on resistor cards as an extra aid in identification. Wires are pre-cut to length and skinned.—(TE&M Lab Report)

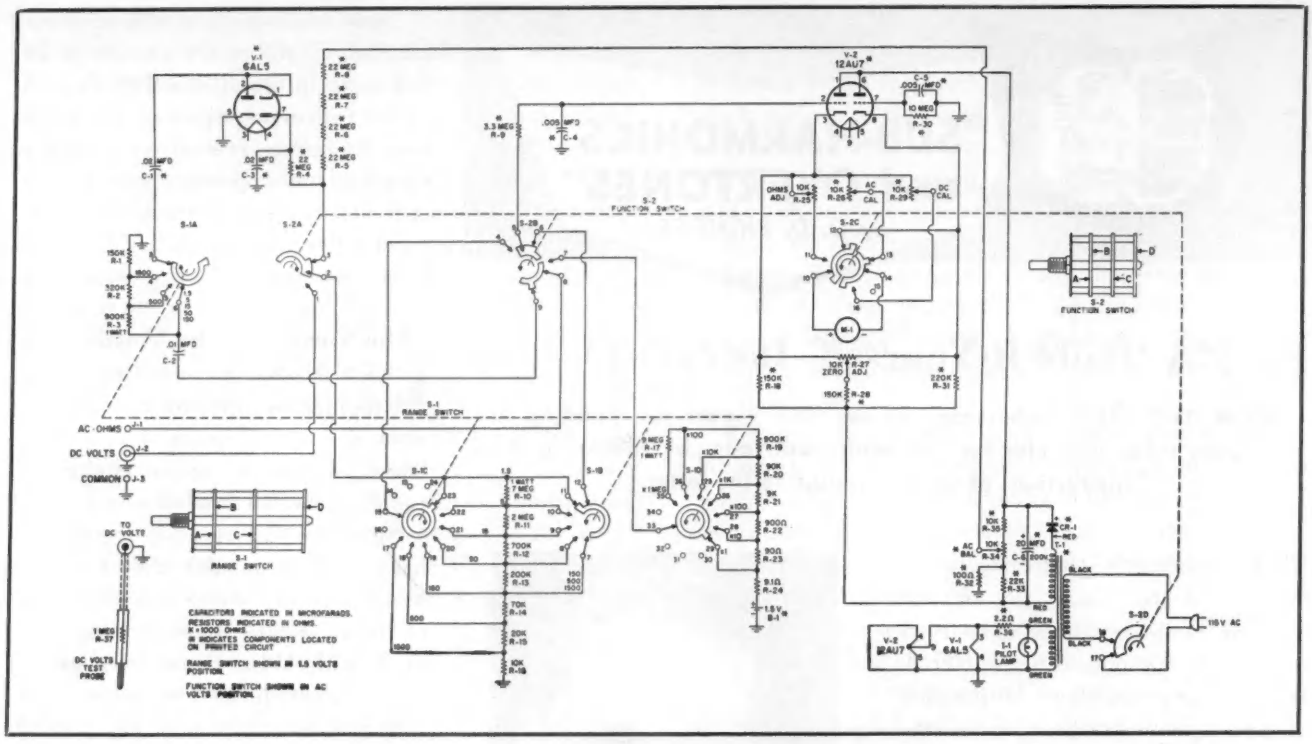


FIG. ONE: — Schematic Diagram, Knight Kit VTVM.

ual, furnished with this kit, is extremely detailed and complete and gives step-by-step instructions on the proper method of assembly and wiring. As an example, all wires have been cut to length and skinned. As a final touch, a more-than-generous supply of solder is also furnished.

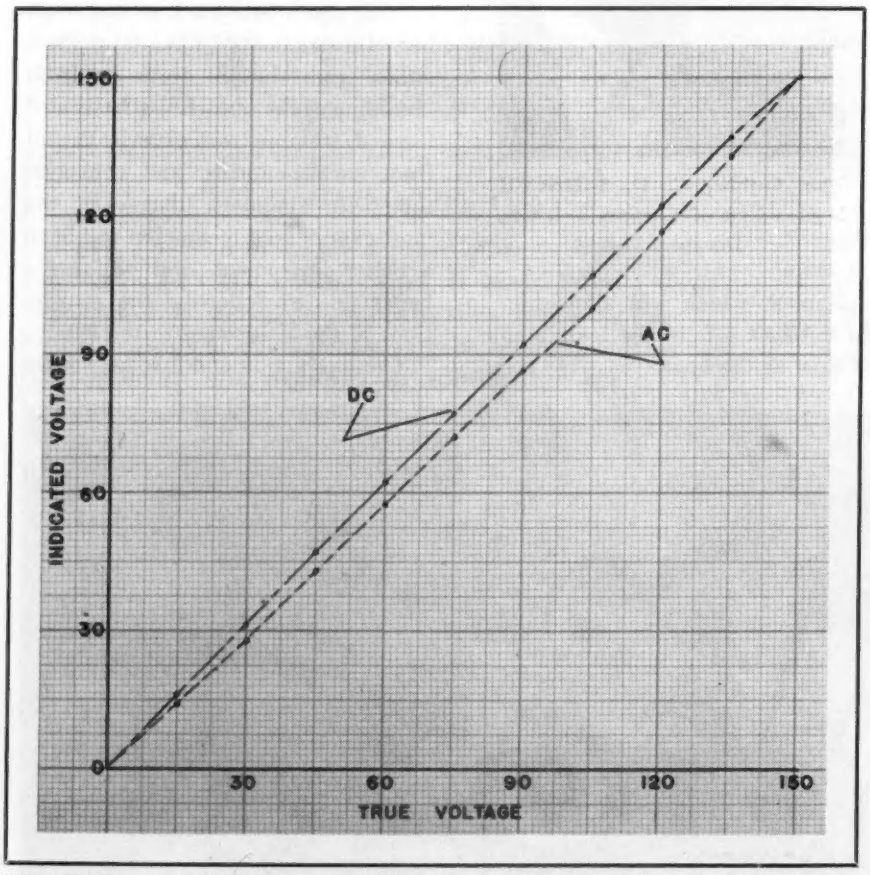


FIG. TWO: — Scale Linearity of the Meter. For this TE&M Lab Report scale linearity tests were run (150 volt scale) for both dc and ac readings. Maximum deviation found was 1.33% of full scale for dc readings and 3.33% of full scale for ac. Accuracy exceeds manufacturer's specified ratings.

"Assembly Time and Costs"

CORRESPONDENCE with the Allied Radio Corporation indicates its engineers consider 4½ hours to be the average construction time required for this particular kit. I found the assembly time to be as follows:

Unpacking and checking parts	20 min.
Mounting of parts	35 min.
Wiring, checking, and calibration	6 hrs. 20 min.
Total time	7 hrs. 15 min.

The above listed time-requirement should be tempered by the fact that I made no special effort to "hurry the job" and, in fact, spent some extra time in dawdling over the various instructions and diagrams for the purpose of analyzing the steps and comparing them to the usual telephone central-office practices.

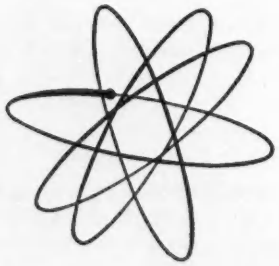
The hand-tools found in any central office equipment room are more than adequate for assembly of such a kit, with one exception — a much better job can be done by using a small soldering iron, of the 40 to 100 watt size, rather than the usual 150 to 250 watt iron normally found in the equipment room.

From the above information, it would appear that a telephone company could expect to have the follow-

Please turn to page 42

TELEPHONE ENGINEER & MANAGEMENT'S

Electronics



NOTE BOOK

By LEO G. SANDS

Prepared for
Educational Division
TELEPHONE ENGINEER & MANAGEMENT
7720 Sheridan, Chicago 26,
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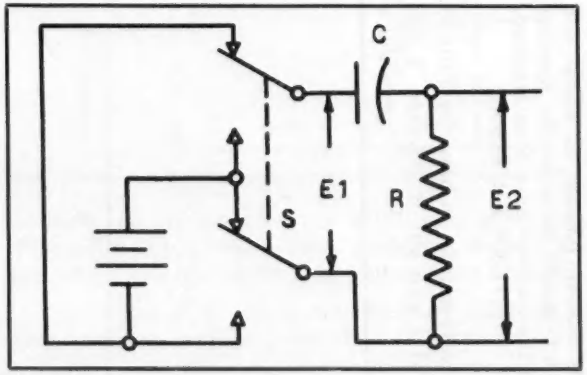
By LEO G. SANDS

2.4-3 — Pulse Forming Network

Ordinarily a square wave signal is generated electronically. It can also be done with a switch. When S is in the position shown, voltage E_1 is steady and at full battery level. When thrown to



the other position, the polarity of E_1 is reversed. As the switch is operated rapidly, a square wave signal appears at E_1 since voltage E_1 rises instantly from zero to maximum and when the switch is reversed it reverses instantly in polarity.

A square wave may be converted into pulses by the action of C and R. When voltage is first applied at E_1, current flows through C and R for a very short time. When C has become charged, current drops to zero and so does the voltage across R which exists only when current flows through C. Thus E_2 is a pulse. When E_1 polarity reverses, C

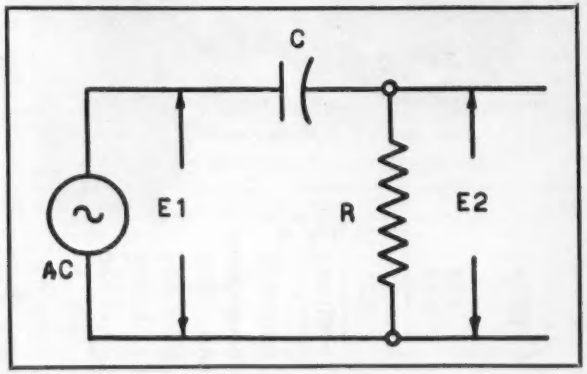
By LEO G. SANDS

is discharged and is again charged but in opposite polarity. Current again flows briefly through C and R, causing a momentary voltage pulse of opposite polarity to appear across R.

2.4-4 — RC Coupling

This is one of the most common circuits used in electronic devices. It is often used at the input of an amplifier stage. At high frequencies, if C is large and R is high, E_2 will be almost equal to E_1 and C acts mainly to block DC from reaching R.

However, if the reactance of C is high (small value of capacitance), it has an effect on E_2. For



example, if C is an 0.01 mfd capacitor and R is a 270,000-ohm resistor and the AC input is at 60 cps, E_2 will be 70% of E_1.

At first glance it might appear that E_2 should be only 50% of E_1 since the reactance of C, which is

More Data For Your "Electronics Notebook" on page 43.

ing capital account on its books for this instrument:

83Y125 Knight-Kit VTVM	$25.75
704 spread account (insurance, handling costs, transportation charges)	7.75
Direct labor (7 hrs. at $2.25)	15.75
702 and 706 spread accounts (supervision, engineering, vehicle overhead)	11.75
Total book investment	$61.00

The figure of $61.00 is subject to considerable variation among the various telephone companies. 702, 704, and 706 spread percentages vary from company to company, hourly labor rates will also vary, and the amount of assembly time may be much shorter, or longer, than the seven-hour figure used here. However, it is felt these figures will give you a general idea of what to expect.

One big maintenance advantage must be considered in connection with any instrument of this type that has been assembled by our central office technicians. After such construction,

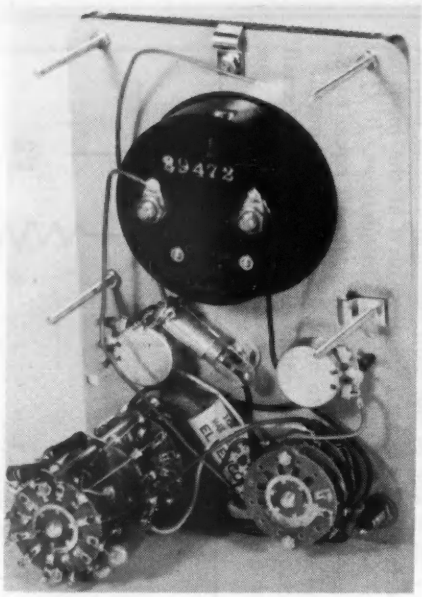


ILLUSTRATION B: — The unit partially assembled. Placement of parts and wiring presents no problems. The wafer switch (shown in lower left corner) should be carefully handled until the resistors have been attached. — (TE&M Lab Report)

it is only natural to have the attitude of "if I can put it together, I can

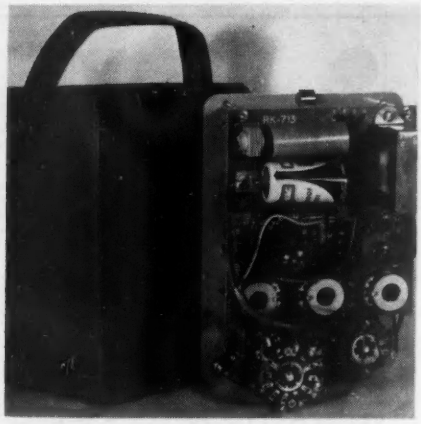


ILLUSTRATION C: — A rear view of the completed unit ready for placement in the case. The printed circuit board is easily assembled and mounts on the four meter attachment screws. — (TE&M Lab Report.)

certainly repair it." This factor is considerable since it represents not only time savings but cost savings in comparison to the usual factory-maintenance of test instruments.

Another factor, which must certainly be considered, is the great training value connected with the assem-

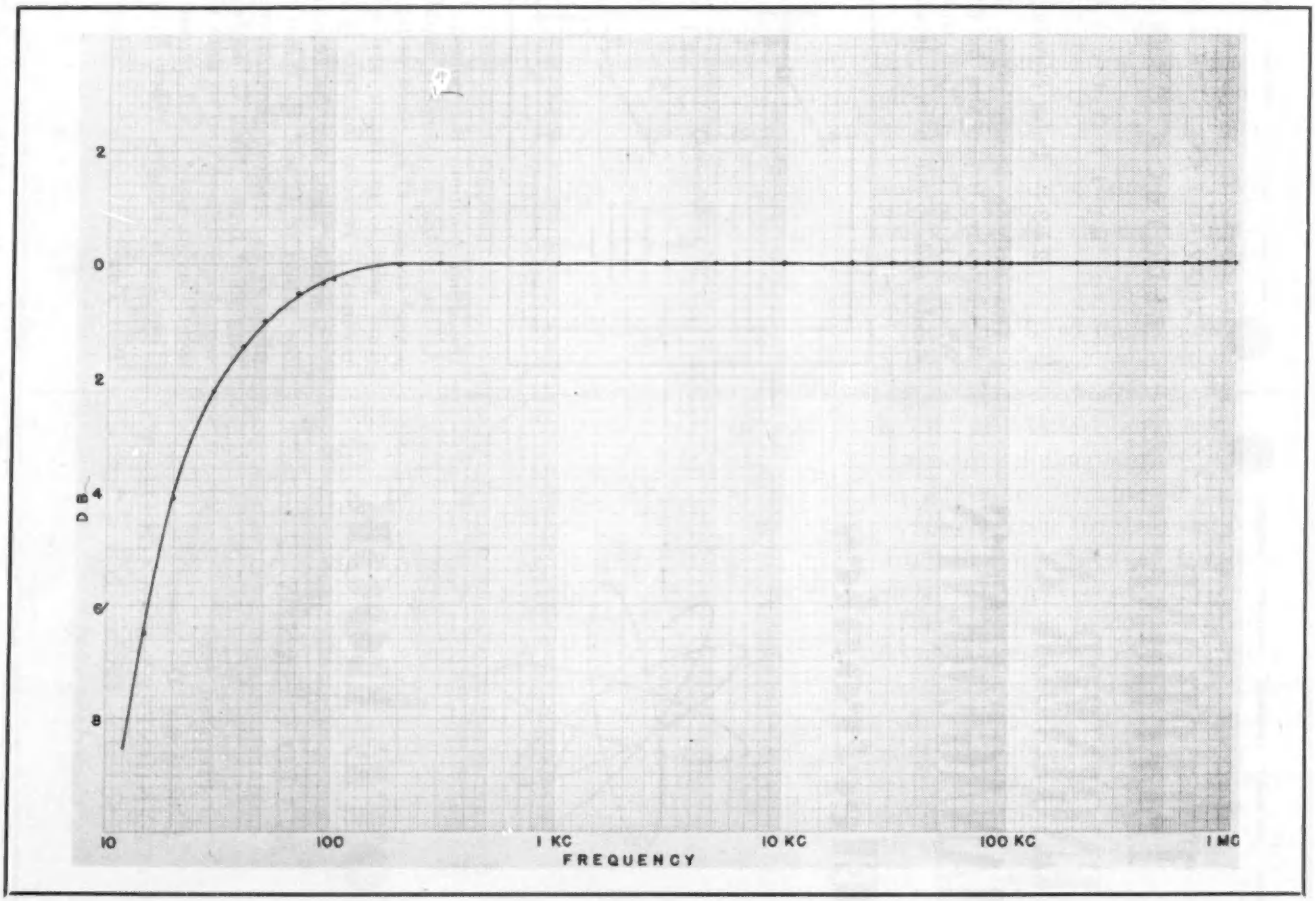


FIG. THREE: — Frequency Response of the Meter. TE&M Lab Tests conducted by Mr. Ehinger, showed the meter is flat from 200 cycles to 2.2 megacycles (portion above 1 megacycle not shown on graph). At the lower end of the frequency spectrum, the meter is down .2 of a db at 100 cycles, 1 db at 50 cycles, 3 db at 25 cycles, and 6 db at 16 cycles. At the upper end of the frequency spectrum, meter readings start rising at 2.2 megacycles and are up 6 db at 3.5 megacycles.

in series with R, is almost equal to the resistance of R. But, this is not so because of phase relationships.

Suppose that E_1 is 100 volts. The load, as far as the input voltage sees it, consists of impedance, a combination of resistance and reactance. It is computed by —

$$Z = \sqrt{R^2 + Xc^2}$$

which in this case comes out to about 378,000 ohms, not 535,000 ohms which is the sum of R and Xc.

To determine E_2 we must know what current flows through R. This is found by —

$$I = \frac{E}{Z}$$

which amounts to 265 microamperes. The voltage drop across R is equal to R_1, or 70 volts, the product of 270,000 ohms and 0.000265 amps.

Thus, when resistance and reactance are equal, the network causes a 3 db drop. In addition, a 45 degree phase shift occurs.

At higher frequencies, the reactance of the capacitor becomes small compared to the value of resistance and the amount of phase shift and voltage drop becomes less.

2.4-5 — Frequency-Sensitive Voltage Divider

This is a typical electronic volume or gain control circuit. It is similar to the circuit shown in 2.4-4 except that R is a potentiometer.

If C is 0.01 mfd and R is 270,000 ohms, E_2 will be about 70 volts when R is set to its maximum

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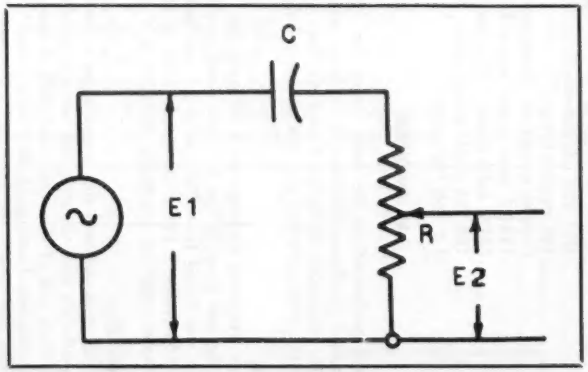

position and the input voltage is 100 volts at 60 cps. When R is set at its electrical midpoint, E_2 will be 35 volts or one half of the total voltage drop across R.

The values of C and R are chosen to establish a low frequency cut-off point. This is commonly the —3 db point which is the condition when Xc and R are equal at the desired cut-off frequency.

For example, to set low frequency cut-off at 300 cps, C should have a capacity of 0.002 mfd when R is 270,000 ohms. Thus, in practice, the low frequency response of an electronic amplifier can be easily adjusted by changing the value of interstage coupling capacitors or resistors.

2.4-6 — Shunt Capacitance

When capacitance is shunted across a resistor, the impedance of the circuit may be computed by —

$$Z = \frac{RXc}{\sqrt{R^2 + Xc^2}}$$

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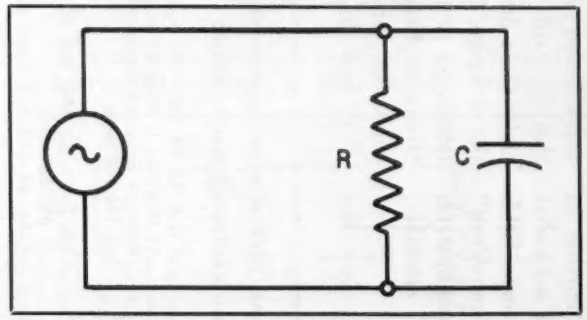
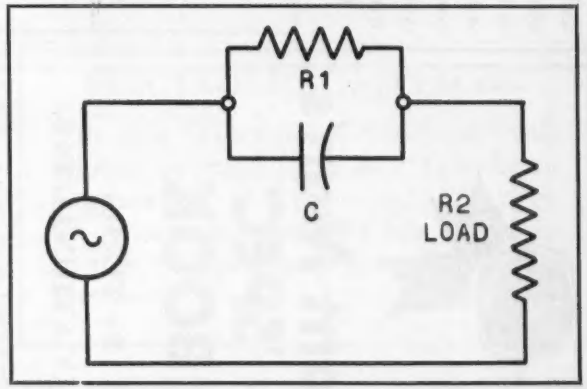


At 60-cps if C is 0.01 mfd (reactance is 265,000 ohms) and R is 270,000 ohms, the impedance will be 187,000 ohms.

At 600 cps however, Xc becomes only 26,500 ohms and the impedance therefore becomes around 23,000 ohms. Hence, it can be seen that this circuit will have a much heavier loading effect on high frequencies than on low frequencies.

2.4-7 — Frequency Compensation



More Data For Your "Electronics Notebook" on page 45.

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bly of instruments. Any telephone technician will have no trouble in construction and, if he is somewhat unfamiliar with the electronic field, will gain considerable "know-how" concerning electronic equipment, components, methods of assembly, wiring, etc.

Illustrations *B* and *C* show the instrument at various stages of construction and further illustrate that electronic test instruments, especially those designed to work up into the rf range, do *not* follow standard telephone practices of laced cable, 90-degree bends, etc. *Illustration C* shows the printed circuit board in place and the instrument completed

TABLE ONE: — LAB-CHECK of Allied Knight-Kit VTVM (83Y125)

MANUFACTURER'S SPECIFICATIONS

DC VOLTMETER:
- Ranges ..... 1.5, 5, 15, 50, 150, 500, and 1500 volts full scale.
- Input Resistance ..... 11 Megohms (1 Megohm in probe) on all ranges.
- Circuit ..... Push-Pull balanced bridge with 12AU7 twin triode.
- Accuracy ..... ± 3% full scale.

AC VOLTMETER
- RMS Ranges ..... 1.5, 5, 15, 50, 150, 500, 1500 volts full scale.
- Accuracy ..... ± 5% full scale.
- Peak-to-Peak ranges ..... 4, 14, 40, 140, 400, 1400, 4000 volts.

OHMMETER:
- Ranges ..... Center scale at 10 with multipliers X 1, X 10, X 100, X 1000, X 10K, X 100K, X 1 Meg.

METER: ..... 4½" 200 uA movement.
MULTIPLIERS: ..... 1% precision type.
PRINTED CIRCUIT: ..... Copper etched on laminated phenolic.
TUBE COMPLEMENT: ..... 12AU7, twin triode meter bridge. 6AL5, twin diode full wave rectifier.
POWER SUPPLY: ..... 105-125 volts, 50-60 cycles AC.
BATTERY: ..... 1.5 volt "C" battery.

LAB FINDINGS

SCALE LINEARITY:
A scale linearity test was performed on the meter, using the 150 volt (150 v.) scale, for both the DC and AC inputs. Maximum deviation error found on the DC scale was 2 volts or 1.33% of full scale. Maximum deviation found on the AC scale was 5 volts or 3.33% of full scale. Results were graphed and are shown in Fig. 2.

FREQUENCY RESPONSE:
The meter was tested for frequency response from 10 cycles per second to 3.5 megacycles per second. Results of the test from 10 cps to 1 mc were graphed and shown in Fig. 3. No discernible deviation was found from 200 cps to 2.2 mc. Below 200 cycles, the meter is down .2 of a DB at 100 cycles, 1 DB at 50 cycles, 3 DB at 25 cycles, and 6 DB at 16 cycles. Above 2.2 mc, meter readings gradually deviated and were up 6 DB at 3.5 mc.

SCALE TRANSFER ACCURACY:
Scale transfer accuracy for both AC and DC functions were checked by setting the meter on the 1.5 volt scale, accurately zero-adjusting the meter, supplying a voltage to cause the meter to read near the high end of the scale, and then shifting to the next-higher scale to check readings. After the initial setting of the "zero adjust", no change of the control was made during the test. The results are indicated on TABLE TWO.

A TE&M Lab Report
Prepared by C. D. Ehinger.

TABLE TWO: — Scale Transfer Accuracy (Lab Report.)

AC Voltmeter

Scale	Set and Read		
1.5 V.	1.47		
5 V.	1.5	4.92	
15 V.		5.1	14.6
50 V.	48.7		15.0
150 V.	50.0	150*	
500 V.		160	500
1500 V.			515

* Maximum transfer percentage error — 1.54% of full scale

DC Voltmeter

Scale	Set and Read		
1.5 V.	1.41		
5 V.	1.45	4.75	
15 V.		4.8	14.2
50 V.	49*		15.0
150 V.	51.5	150	
500 V.		155	448
1500 V.			460

* Maximum transfer percentage error — 1.25% full scale.

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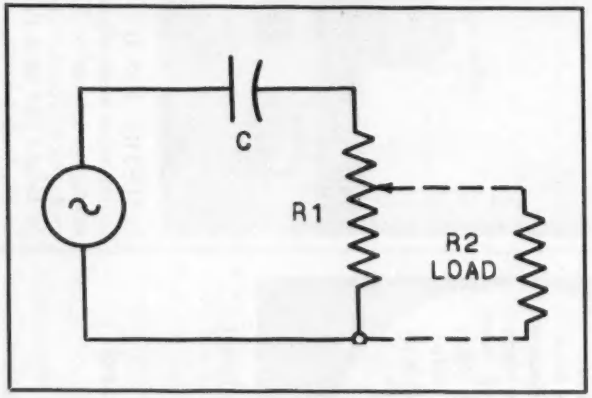
In this circuit resistance and capacitance are paralleled, but the combination is in series with the load. If the AC input voltage varies in frequency, the voltage that reaches the load will be greater at high frequencies than at lower frequencies. This would be the case even if R_1 were not shunted across C. However, R_1 minimizes the attenuation in the circuit at the lower frequencies where the reactance of C becomes large.

2.4-8 — Effect of Load

Here we have the basic volume control circuit in which the frequency response curve depends upon the values of C and R, whose relationship varies with frequency. Its characteristics will change



if a load of relatively low resistance is connected as shown in the dotted lines. With the potentiometer set to its minimum position, the frequency characteristic is not changed. However, as the potentiometer contact is moved up, the load reduces the

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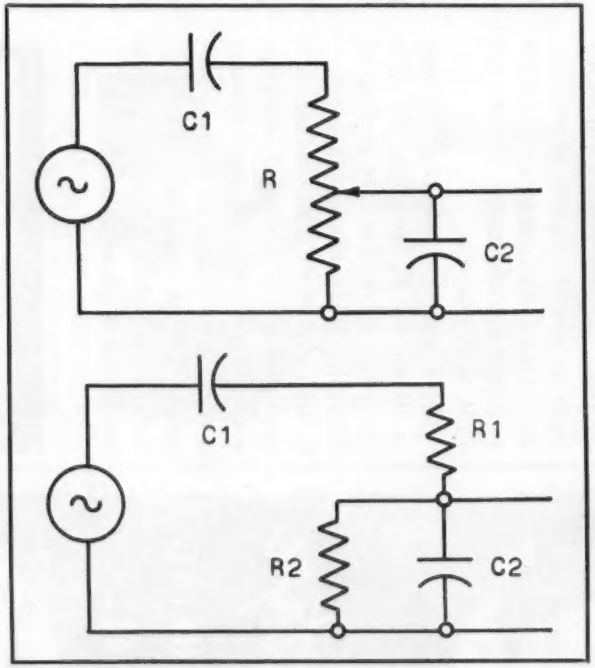
value of R in the circuit and hence changes the relationship of Xc to R.

2.4-9 — Effect of Shunt Capacitance

If a capacitor C2 is shunted across the output of the potentiometer, the high frequencies will be attenuated to a degree depending upon the relation-



ships of the reactances of C1 and C2 and the value of R which changes with the setting of R. The circuit effectively becomes as shown in the lower diagram.

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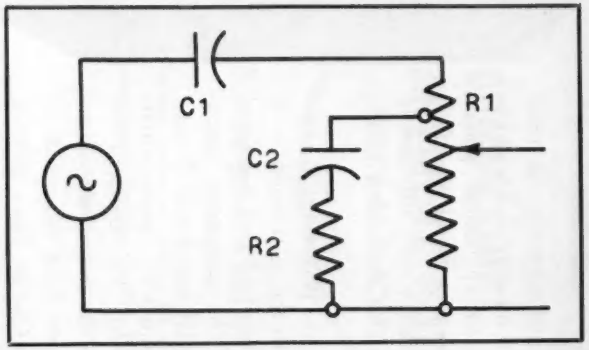
2.4-10 — Frequency Compensation in Volume Control

In some radio receivers and audio amplifiers, frequency compensation is provided by connecting



capacitors and resistances to one or more taps on the potentiometer. This provides frequency compensation whose degree varies with the setting of the potentiometer.

ELECTRONICS NOTEBOOK

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to the point of readiness for calibration.

I have only one suggestion to make concerning the assembly: The addition of flat control-washers placed under the control-nuts of the four panel controls materially aids assembly and eliminates scratching of the panel.

Calibration was performed in exact accordance with the instructions contained in the manual and presented no problems. The completed instrument was then lab-tested and checked against the supplier's specifications for the instrument. The results of this *Lab-Check* are shown in *Table One.*

It can be seen from the report of the lab (*Table One or Two*) that the meter assembled, for this *Telephone Engineer and Management* article, actually exceeds the supplier's specifications by a healthy margin and their guaranteed performance figures are quite conservative.

On the practical side, and as shown in *Illustration D,* the large, 4½ inch meter-face allows for easy reading of the scales. It would seem unnecessary to list the many, varied uses for such an instrument in the telephone equipment room. Some of the more obvious applications are carrier testing, continuity checks, oscillator checking, and on and on to an almost endless number of applications.

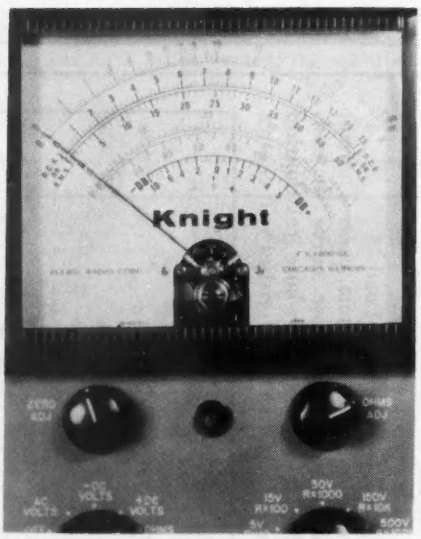


ILLUSTRATION D: — The 4½ inch meter movement allows a large, easily read, meter scale. The top (ohms) and third (peak-to-peak) scales are in bright red as a further aid in distinguishing between scales. — (TE&M Lab Report.)

The completed vacuum tube voltmeter.

Let us not forget that test instruments in the telephone equipment room can pay for themselves over and over again. — *C. D. Ehinger.*

— 73 —

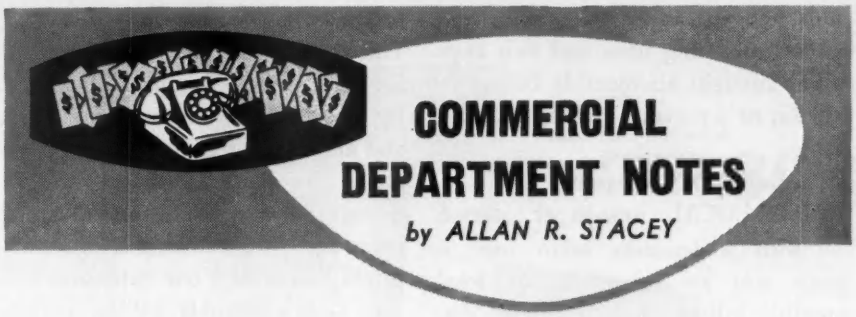
Manufacturer's Comment: —

For whatever value it may be to the servicing of telephone equipment, the Knight-Kit VTVM reads "peak-to-peak" with scales both in RMS and Peak-to-Peak. The RMS scale is accurate only for pure sinusoidal signals. The value of peak-to-peak readings is the ability to read peaks even on complex waveforms such as speech. Lines may then be continuously monitored for overmodulation.

This instrument also has a db scale which may have value in your work. Note the convenient 3 to 1 ratio between scales, permitting use of next lower scale if voltages read in the lower 1/3 of the scale. This increases reading accuracy.

Mr. Ehinger has done a fine and very complete job in describing the Knight-Kit VTVM to which we can add nothing of real value.

This kit is available only at Allied Radio Corporation., 100 N. Western Ave., Dept. TE&M, Chicago, Ill. The stock number is 83 Y 125 and the kit is priced at $25.75.



"Making Real Revenue Gains"

A CALIFORNIA operating telephone man revises an old nursery rhyme to make revenues of the company jingle to the tune of "the doctor, the grocer, and the local newspaper."

WE USED to have a little nursery jingle which involved "the butcher, the baker and the candlestick maker." One of my good California telephone operating friends was telling me how he revised this rhyme so that telephone revenues would jingle to the tune of "the doctor, the grocer and the local newspaper."

He was driving me out to the airport and we got to discussing the prospects of a small or medium size exchange increasing its revenues by selling additional services to existing business subscribers. You will recall that in the January 15th issue of TE&M we described a program of visiting business subscribers and said that one of the large benefits was the improved public relations. My friend discounted this public relations idea heavily and said that many of us small Independents are ignoring entirely the opportunities for making real revenue gains in our small exchanges. I challenged him to come up with facts and here are some that he produced.

The first illustration concerned the local physician whose service consisted of:

Business Main Line	$ 6.50
Extension	1.50
Off Premises Extension	1.50
Mileage	3.00
Additional Listing	.35
Total Monthly Bill	$12.85

After a personal visitation by the sales-minded manager of this exchange the doctor's service consisted of:

The author, ALLAN R. STACEY, is vice-president of the Sunland-Tujunga Tel. Co., Sunland, Calif.

Two trunks	$19.50
Two Keys in Lieu	3.00
Two Hold Keys	1.50
Two Switch Keys	1.00
Off Premises Extension	1.50
Mileage	3.00
Additional Listing	.35
Total Monthly Bill	$29.85

What made the doctor spend $17.00 a month more for additional telephone service? The single sales argument that seemed to have most appeal was that in the event of an incoming emergency call the doctor's single line might be tied up by the nurse ordering stationery and that as a result the doctor might lose one accident case which could take care of his telephone bill for an entire year.

The Grocer

INITIALLY the grocer's service consisted of one business line and an extension for a monthly billing of $8.00. Following a call by our telephone friend the grocer had two trunks, two keys in lieu, two switch keys and two hold keys thus making his monthly billing $25.00, or an increase of $17.00 per month.

Our telephone man was certainly a good salesman for keys.

The appeal to the grocery store was servicing his customers and not having a line busy when they called. A busy line encourages customers to take their trade elsewhere. It was pointed out to the grocer that incoming calls with order lists could tie up a line for some time and that a busy housewife unable to reach that particular grocer before delivery time could certainly consider calling his competitor. One good Monday morning order for groceries might amount to $25.00 or $30.00.

The Druggist

OUR DRUGGIST started out with one business main line at $6.50 and a joint user for $1.50 to total $8.00 revenue per month. As with the grocer the druggist was sold the advantages of a second incoming line including a hold key and a switching key and continued the joint user. This changed his monthly billing from $8.00 to $22.25, or an increase of $14.25. The sales argument to the druggist was similar to that used for the grocer but stressing, of course, the calling in of prescriptions and the value to him of his prescription business.

The Florist

THE FLORIST had only a business main line at $6.50 per month. It was pointed out to him that a great many of his orders were received by telephone and if the customer wasn't able to reach him, particularly on funeral services with short notice, people were very likely not to purchase flowers but to send their donations to the Heart Fund or some other place and thus the florist would lose this business entirely. The florist thought this was a good argument

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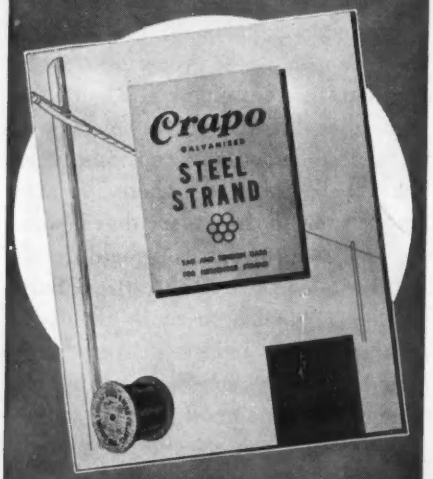
Sag and Tension Data For Strand When Supporting Telephone Cable

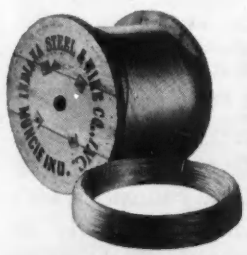


WRITE FOR THIS NEW MANUAL!

Those who design, build and maintain aerial telephone cable lines will find the technical information in this manual both pertinent and useful.

The sag and tension data cover three sizes of "Utilities Grade" strand when used as messenger to support plastic-sheath or lead-sheath cable. These data will be helpful in determining the size of strand to be used for a particular weight of cable and span length, and in answering other questions relating to design problems.

This Manual will be mailed without obligation to all interested telephone men. Ask for Manual No. MS-58.



Crapo Galvanized Steel Strand (for both messenger and guys) is available in all standard sizes and grades and in Class A, B and C coatings.

INDIANA

STEEL & WIRE CO., INC.

Muncie, Indiana

and changed his business main line to two incoming lines and two keys which brought his monthly billing to $14.25, or a revenue gain of $7.75.

The Local Newspaper

THE LOCAL newspaper started with a business main line, a gong and an extension for total monthly billing of $8.60. After discussion with the telephone manager the newspaper took two trunks, two keys in lieu, two hold keys, two switch keys and a gong. This produced a total monthly billing of $25.60 or an increase of $17.00 per month. The most effective sales argument with the newspaper was that people call in to give news items and after one or two tries of finding the line busy people would simply forget about calling in the news.

Some General Tips

YOU WILL recognize that this type of sales program often requires that the subscriber change his telephone number. Our sales-minded telephone friend found that directory change time was the "natural" for making this number change drive because nearly every one of these telephone numbers had to be changed to put it into a trunk hunting group. He says that additional sales assistance was found in being able to supply these customers with little stickers for their invoices to notify their own customers of number changes and also postcards to be sent to their customers. Businesses other than doctors made use of the fact in their advertising that they had installed this extra line service for the benefit of their customers.

Why Bother?

SOMETIMES folks raise the question, "Why work hard to gain additional revenue from selling extra equipment when most of us can do all right by just plugging along?" My friend had an answer for this one too.

For years the one small hotel in his community had been using a PBX with two trunks and sixteen extensions in hotel rooms plus some miscellaneous equipment, all of which produced a monthly bill of $55.45. This looked like real stable revenue for the telephone company. However, the hotel began an economy drive and all at once removed the PBX and all of the room extensions and reduced the service to one business main line, two extensions, one additional listing and one extension bell. The hotel's monthly billing became $10.35 and therefore created a revenue loss of $45.10 per month.

You can see that this loss of $45.10 was more than offset by the revenue gain of $73.00 in the services described above. But, where would this telephone man have been if he had not sold the additional equipment?

It looks as if we have to be sales-minded in order to stay alive. I think I'll go out and look up my own "butcher, baker and local newspaper."

"Welcome Wagon" Again

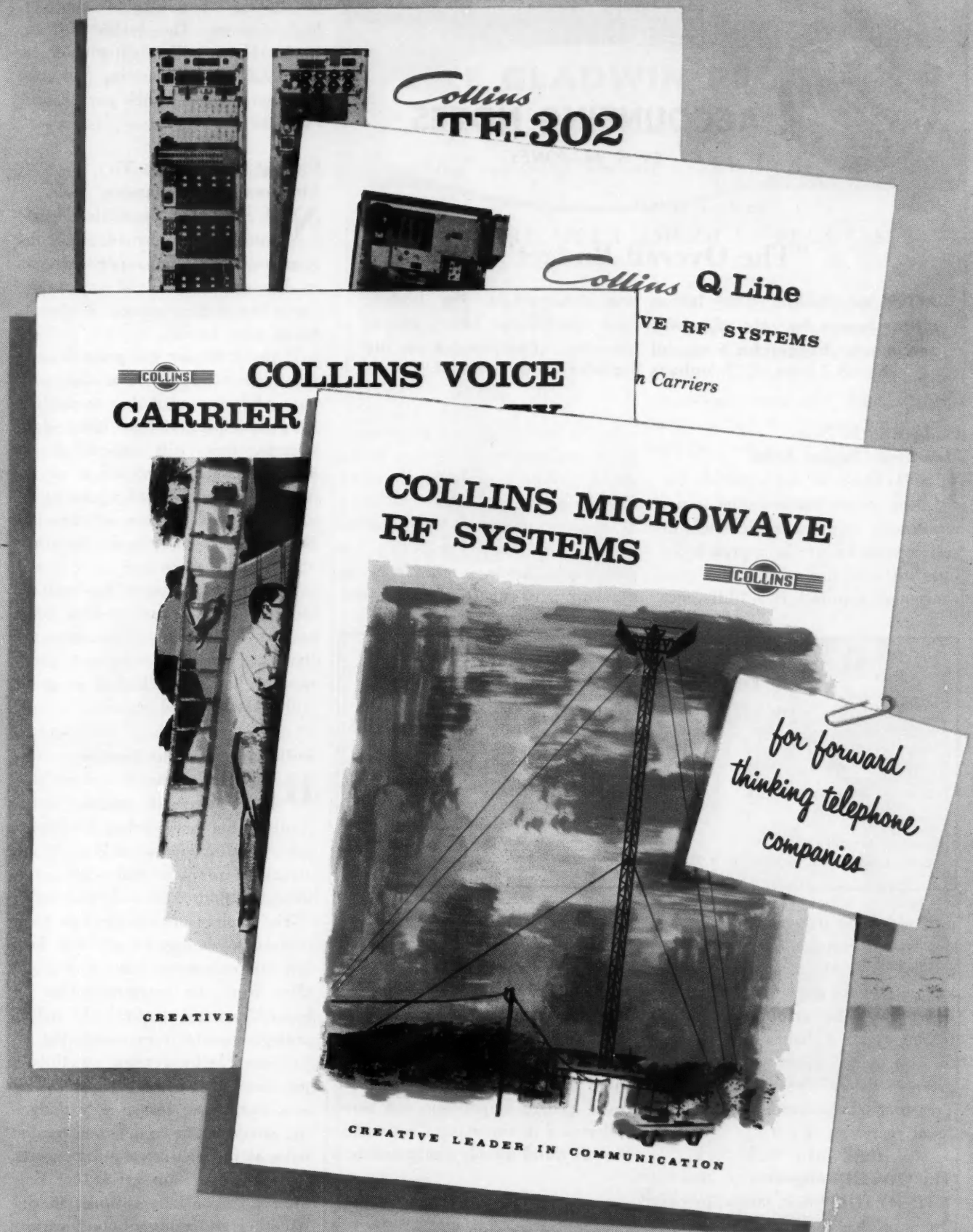
IN A RECENT issue we described the use of "Welcome Wagon" service to measure the quality of our performance. You will recall that this is a service whereby a representative of that organization calls upon newcomers within your community.

The "Welcome Wagon" people shortly after reading our column called to tell me that in addition to assisting in sampling public reaction to our services they can also give a material boost to sales of certain telephone items. For example, they say they are strongly aiding the General Company in Indiana in selling additional listings. It looks to me as if the more people we can get into this selling act the better off we are.

Next Issue

WE RECEIVED a most interesting letter from *Karl Steinhauer* of Des Plaines, Illinois, asking several pointed questions about the ownership of telephone booths and types of paystation commissions paid. We'll discuss these in your next issue. See you then. — *Allan R. Stacey.*

TEM is happy to bring Allan Stacey's new department as a regular "every-issue" feature. If you need help on a commercial problem send it to Mr. Stacey in care of TE&M.



a sensible step in your evaluation of microwave would be to send for Collins literature . . . RF, Carrier, Carrier Telegraph.
address Collins Radio Company, Texas Division Sales, 1930 Hi-Line Drive, Dallas 7, Texas.

COLLINS

COLLINS RADIO COMPANY • DALLAS • CEDAR RAPIDS • BURBANK

ACCOUNTING NOTES

by G. M. JONES

"The Overall Budget"

AFTER the budget data leaves the departments, the budget officer leaves his role of advisor and coordinator and prepares one master budget for financial planning. (Continued from the March 1 issue of "Telephone Engineer & Management.")

Budgeting In Non-Measured-Output Areas

ESTIMATES of requirements for departments whose output is not measurable in any specific kinds of service units have to be approached a little differently. Probably the most convenient approach is a "difference method." With this method, the current year's expenses (for each category of expense) within a department are adjusted for any expected changes in services to be performed, and then for any expected change in wage rates or in material prices. The example given in Table 7 is for an imaginary Treasurer's Department for the 1959 fiscal year.

TABLE SEVEN
Budget Estimates, Treasury, 1959

	Salaries	Machine Rentals	Office Supplies	Travel	P/R Supplement	Occupancy	Total
1958 Expenses	16,000	3,900	720	1,220	1,300	1,660	24,800
Adjustments:							
Machine Rentals		700					700
Salary increases	6,400				522		6,922
Staff reduction	(3,200)				(256)		(3,456)
			134				134
			32				32
Contract Benefits					240		240
1959 Budget	19,200	4,600	886	1,220	1,806	1,660	29,372

The Overall Budget

UP TO THIS point, budget preparation has been in the departments. Now it is necessary for the budget officer to leave his role of advisor and coordinator and for him actually to bring together all the departmental budgets into one master budget for financial planning.

In the process, he will bring manpower requirement projections to the attention of plant supervision, toward the objective of efficient scheduling of maintenance or minor construction work in slack periods to avoid peak loads. Review of departmental estimates *with* department heads and general supervision makes for uniformity in procedure and discourages packing of estimates.

The latter is one danger in self-determination of needs, particularly in a company which has a record of administrative miserliness. An experienced budget officer with an experienced general supervisor can sense differences in supervisors' estimating liberality and usually can persuade a too liberal supervisor to reconsider his estimates. The budget officer works closely with the treasurer in moving from the operating and construction budgets to the payroll and cash budgets.

EDITOR'S NOTE

"Accounting Notes," by Dr. Gardner M. Jones, will appear in each issue of TE&M. If you have accounting questions, address them to Doctor Jones, care of TE&M.

Fitting The Budget To The Available Finances

NOW SUPPOSE that all the departmental budgets, made up conscientiously by the supervisors, in total exceed the financial revenue expectations of the company. Where do we go from here?

If past behavior has given department heads confidence in the company officers, and if they themselves have participated in the initial budget attempt, they will respond to a straightforward presentation of financial facts with a willingness to review and replan their activities to help make expenditures fit the available financial resources.

At the same time, a top-level revision of plans is indicated, to defer or curtail particular programs or activities. Even in government, it is rare for the initial budget to stand without substantial revision.

Following Up The Budget

HALF THE value of budgeting is in the systematic planning which it entails, but that is not its whole purpose. Finding out what did not go according to plan, and why, is an important part of the budgeting story.

The supervisor himself uses comparisons of budget to actual to help him concentrate on particular deviations from the operating plan. To help him help himself, he needs *prompt* reports from accounting on (1) what the budget said was to happen and (2) what did happen. This is a convincing reason why budgeting should not be on the same account basis as the final accounting reports, i.e., the latter are arrived at only after a lot of time is spent in distributing and re-distributing various overheads to the many detailed accounts.

Budget reports cannot afford to be such ancient history; therefore, budgets and budget reports should both be on a where-expenditure-is-incurred

basis. It would be very appropriate to shove aside other accounting work at the end of the month and to concentrate on information for the supervisors, i.e., budget reports. Every day's delay weakens their effectiveness.

Now it would be possible, with modern accounting machinery, to bury departmental managers under an avalanche of reports. If physical volume of reports is used as a measure of productivity, it is easy to justify an increasing output of paper, with a negative increment of usefulness to operating people. Accounting departments must cultivate the art of highlighting items pertinent to departmental operation. It takes a lot of communication and conversation to arrive finally at what it is managers want, but there should be no letup in attempts to make budget reports be actionable reports tailored to fit the needs of the particular user.

Variances from budget are not always the kind that call for correction. An experience that results in a *good* variance may very well be something that can be duplicated, and certainly should be duplicated.

For those items that show significant variances from budget, sufficient detail should be presented to help the supervisor run down and act on the particular problem.

For those significant variances that are not controllable at the departmental level, sufficient detail should be supplied (by accounting) to the next higher management level, that the later can isolate and study the particular problem.

For items that do not vary enough from budget to call for investigation, there is no point in complicating reports to supervisors with unneeded detail. Only gross categories and values should be presented, for information rather than for action.

Use Of Standards For Repetitive Operations

WHILE BUDGETING is a broad-gage tool for planning and measuring departmental performance, budget reports may still be insufficiently detailed to narrow down the specific operations within a depart-

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The high standards of quality, the absolute essentials, everything necessary, are all combined to enhance telephone sales as looking

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are a new concept in protected pay station installations and will sell more public telephone usage because customers will allot better locations for the public telephone and they are more attractive.

**Patent Pending*

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List Price $60.00

- Gleaming crystal clear plastic sides.
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All the qualities that are demanded for certain locations in today's pattern of service is found in the gleaming, smartly designed, soundly engineered, Gladwin

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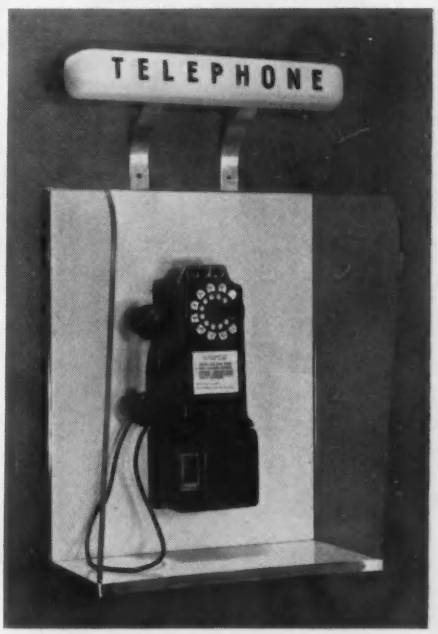

GP-4010
with
GP-1160 Slim Sign

Sign may be ordered separately and Shelf-ettes may be ordered with directory storage beneath.

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t attendant cabinet

H AUTOMATIC'S P-A-B-X SYSTEMS

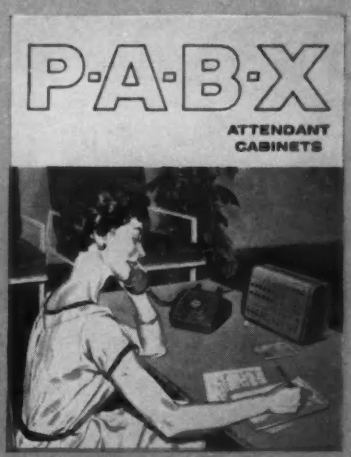
Here's the new Type 51 Attendant Cabinet. *It uses less desk space than a typewriter!* Yet it efficiently handles up to 10 trunks and 80 lines! This cordless unit is standard equipment with the Type 25B P-A-B-X System. It can also be used with Types 50B and 75B.

Trimline Styling, a new streamlined design, gives the Type 51 its compact shape. It's only 13¾″ wide x 8″ high x 7″ deep! Because the key panel is slanted, the Type 51 uses a minimum of desk space and the supervisory lamps are easy to see. The smart two-tone gray finish blends into the color scheme of any office. It's easy to operate, too—even an inexperienced person learns how in a short time. This modern attendant cabinet is sure to please your business subscribers. You'll find it a valuable help in selling P-A-B-X.

Stock Delivery! Automatic Electric gives you stock delivery on *all* six of its P-A-B-X Systems. This means you can offer businesses, large and small, a ready-made P-A-B-X System. It means you can give quick shipment, too. You'll build sales as well as satisfied customers.

Write for Circular 1922!

It tells all about our desk and floor-type attendant cabinets. Address: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call, Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.*



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THE GLADWIN
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HAS BEEN STANDARDIZED BY ONE OF THE WORLD'S LEADING TELEPHONE COMPANIES BECAUSE IT ***PROVED IN SERVICE*** THAT IT IS OUTSTANDING IN PERFORMANCE, AND THAT IT IS THE LOWEST COST (POINT FOR POINT) MOST COMPLETE OUTDOOR TELEPHONE BOOTH.

SUPER MARKET
List Price $142.50
complete with signs and lighting. There is no lower price on today's market.

Are you interested in taking advantage of the reduced cost of outdoor public telephone installations? Send for the facts. **Patent Applied For*

SERVICE STATION
Get literature on how this installation can work for your company.

TROLLEY STOP
2 full size booths removed due to uncleanliness—2 BOOTHETTES installed. Equipment savings $800.00! Revenue increased $58.00 per month.

Inspired styling created the BOOTHETTE to meet today's demand for modern telephone service.

Gladwin's colored brochure of 10 typical installations will help your customer give you a better location.

WHEN TIME MEANS MONEY NOTHING DOES IT LIKE GLADWIN PRODUCTS. THE HIGH STANDARDS OF QUALITY ASSURE THE PUBLIC TELEPHONE GOING FORWARD WITH TODAY'S PROGRESS.

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ment which may underlie reported budget variances.

For any kind of activity occurring in volume (the installation of Tix, for example), if there is persistent difficulty in meeting budget, it may be worthwhile to adopt standards in the same way that manufacturing enterprises do. Standard times for the performance of any duty may be set from historical records, from engineered time studies, or from observation during a chosen base period.

The reporting process is more complex and time-consuming for accounting, particularly, although not for people on the job. Because of the additional analysis required, standards are recommended only for those activities which seem to be difficult to manage according to the operating plan. There are great possibilities for operating efficiencies through the application of standards in troublesome control areas, but do not attempt to bring in standards until you have first made the maximum use of budgetary control. One new thing at a time!

Keeping Supervisors Informed

ABOVE ALL, throughout the budgeting process, supervisors must be kept informed of things that affect them and their ability to develop reasonable estimates or to follow their plans. They simply cannot work in the dark. Informed employes are better employes — and being informed is not the same as being fed selected bits of information through the local newspaper or the plant organ.

Informed means *fully* informed, with news that comes down through the company itself. Fully informed lower levels of management can help the whole company do a better job. Communication of company plans to supervisors is essential to the budgeting process; it is just as essential to the maintenance of a productive organizational atmosphere. — *Gardner M. Jones.*

"Accounting Notes," will appear in each issue of TE&M. If you have accounting questions, address them to Doctor Jones, care of TE&M.

PLANT NOTES ON NEW DEVELOPMENTS

by JOHN S. REED

A Packaged Program Equalizer

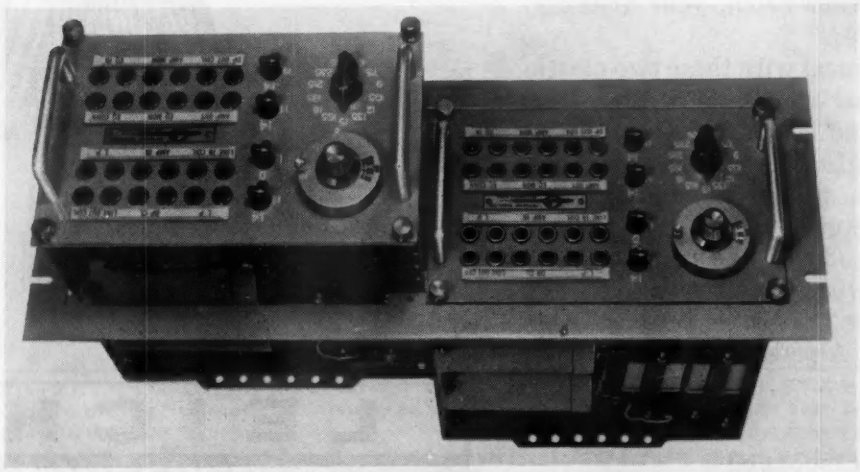
Program equalizer is designed to provide a flexible means of adjusting a telephone circuit to carry high quality radio programs. Universal type equalizer reduces time and effort in lining up circuit.

Equalizer Saves Time In Setting Up Program Circuits

THE PACKAGED program equalizer (see illustration) is designed to provide a flexible means of adjusting a telephone circuit to carry high quality radio programs. The average exchange circuit is limited to frequencies of up to around 3000 cycles and even then it tends to discriminate against frequencies approaching this limit, peaking between 1000 and 2000 cycles. Nevertheless, for ordinary telephone conversations, intelligibility is satisfactory and there is no need to use compensating devices to improve the transmission quality of the circuits in most cases.

In certain situations, however, a telephone circuit may require special treatment to adapt it to transmitting a band of frequencies greater than the 3000 cycle limit. Thus, a radio broadcasting station may ask for circuits that can transmit up to 5,000 or 8,000 cycles with minimum distortion within specified limits. On occasion, it may want a circuit with a high frequency limit of 15,000 cycles or even greater for high fidelity programs.

When the circuit is between the studio and the broadcasting station an equalizer can be permanently inserted in the circuit and adjusted so that the line loss is equal for all frequencies below the high limit. However, the radio station may also request a temporary circuit to carry a special program from some other location. Since there is no way of knowing beforehand the characteristics of the circuit, a tentative RLC equalizer network must be set up and adjusted to properly equalize the circuit. This is a time consuming procedure, particularly on frequencies of 15,000 cycles or higher, requiring perhaps half a day for even a skilled technician in the latter case.



AIRTRONICS packaged program equalizer for reducing line up time in setting up program circuit. Model shown is twin-unit for rack mounting; also available in single unit model.

The universal type equalizer is intended to reduce time and effort in lining up the circuit. This equalizer is employed to equalize attenuation distortion over any range of frequencies up to 25 KC, including the normally used upper limits of 5, 8, and 15 KC.

The equalizer element (*See Page* 60) is essentially a two terminal network consisting of a 251-A retard coil and a 187-A capacitor, shunted to form an anti-resonant circuit, which is connected in series with a continuously variable resistance. This resistance controls the insertion loss of the LC network, and therefore the total degree of equalization provided.

Values of L and C are selected by a switch to maintain the L/C ratio essentially constant but the peak of resonance is shifted upward, in 1½ KC intervals, from 6 KC to 26 KC. Dial calibrations for this switch are the upper bandwidth cut-off frequencies. For those few cases where the cable characteristics may require altering the L/C ratio, an additional switch may be provided.

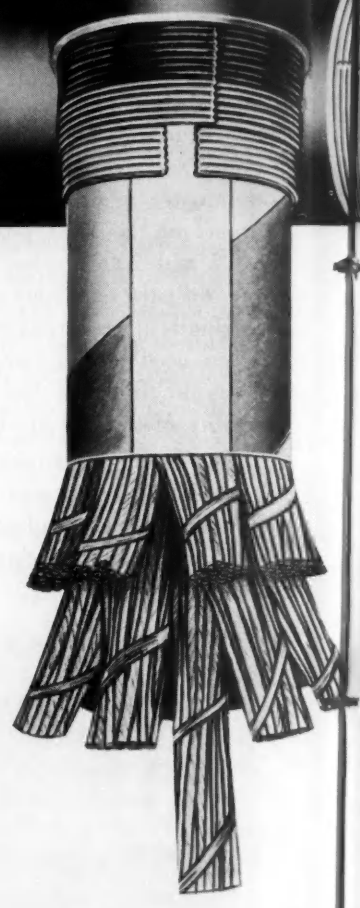
Two other switches control a 111-C type repeating coil circuit arrangement by which line to drop ratios of 150:600, 150:150 and 600:600 may be selected at will.

A fourth switch controls the circuit location of the RLC network so that it may be connected to either the line or drop side of the input coil. Shunt equalizers are inherently unbalanced to longitudinal voltages, therefore, it is to be expected that this switch will normally be set to DROP, except in those few instances where the cable pairs are not subject to noise induction and it may be desirable to bridge the RLC network on the line side to take advantage of partial equalization through impedance mismatching at low frequencies.

The network insertion loss is controlled by the variable resistance, which is a 1,000-ohm, ten-turn pre-

Please turn to page 60

from LEICH...



With Alpeth and Stalpeth cable you gain easy installation, superior performance, and greater economy. Both cables are available from Leich, your friendly, dependable source of supplies.

Installation is more economical with these two plastic cables. For example, in aerial installations, there is a reduction in messenger strand size and pole supports, or an increase in span lengths. Because Alpeth and Stalpeth are lighter weight, pulling in underground systems is easier and less expensive.

Like all General Cable products, the moisture-and-corrosion resistant sheaths will guarantee you years of dependable service. Whatever your cable needs may be, you can get the full story of Alpeth and Stalpeth from your Leich representative.

**Manufactured and sold under patent license agreement with the Western Electric Company.*

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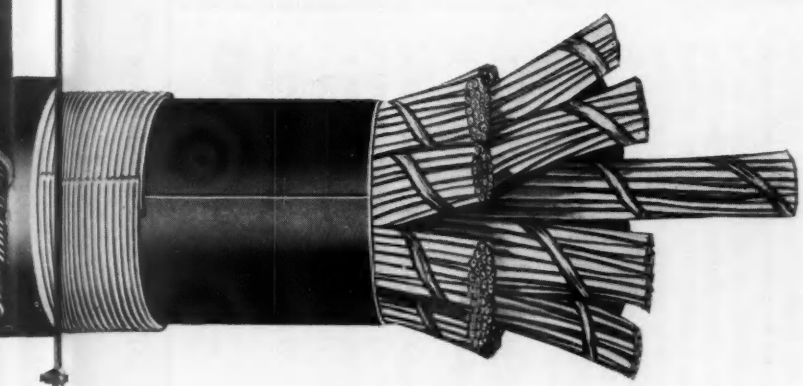
the best in telephone cable



★ lightweight
★ handles easily
★ installs rapidly
★ superior performance
★ greater economy

Alpeth*

ALPETH

Alpeth is ideally suited for polyethylene insulated telephone cable. It consists of a combination of 2 components: a low-resistance aluminum tape shield applied longitudinally over the cable core; and an extruded, high molecular weight, moisture- and weather-resistant polyethylene jacket. Alpeth has full color coding. Available in conductor sizes, 26 AWG, 24 AWG, 22 AWG and 19 AWG in cables ranging from 6 to 404 pairs. Send your inquiries for prices and deliveries now!

Stalpeth*

STALPETH

Stalpeth offers a superior degree of protection against diffusion of moisture and is better suited for protection of paper insulated telephone cable. Stalpeth consists of 3 components: first, a corrugated aluminum shield tape is applied longitudinally over the cable core; secondly, a corrugated, coated steel tape is applied longitudinally with the overlap seam soldered; and finally, an extruded, high molecular weight, moisture- and weather-resistant polyethylene jacket is plastic cemented to the steel tape. Available in sizes 26 AWG, 24 AWG, 22 AWG, and 19 AWG in cables ranging from 16 to 2121 pairs. Send your inquiries for prices and deliveries now!

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TELEPHONE ENGINEER & MANAGEMENT'S

PLANT MAN'S

"SPEC" BOOK

Prepared By
Educational Division
TELEPHONE ENGINEER & MANAGEMENT
7720 Sheridan, Chicago 26,
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7. Line filters (at junction of cable and open wire).
8. Office grounds of connecting companies with carrier facilities owned by telephone company.

By using a ground resistance test set, the resistance of the ground can be measured at the point where the central office or pole protector ground is installed. Since the telephone cable sheath is grounded at the central office, the ground connection is temporarily removed from the cable messenger at open wire and cable junctions to obtain the true ground resistance at these points. Resistance readings over specified limits, depending on the kind of buried ground employed, call for an investigation to determine the cause of the high reading and corrective measures are then taken to reduce the resistance to a value below the maximum permitted.

This procedure has proved its worth for many companies in revealing a surprising number of open or high resistance grounds, which might never have otherwise been detected, and which probably account for mysterious failures of protective apparatus in these locations and expensive damage to telephone circuits and central office equipment.

Description and Operating Principle of Vibrator Type Ground Resistance Test Set

A typical ground resistance test set is illustrated in *Figure One.*

This instrument is provided with two short probes and leads for connecting to auxiliary or reference grounds, also a 50-foot ground lead for connecting to the ground under test. One auxiliary probe lead is

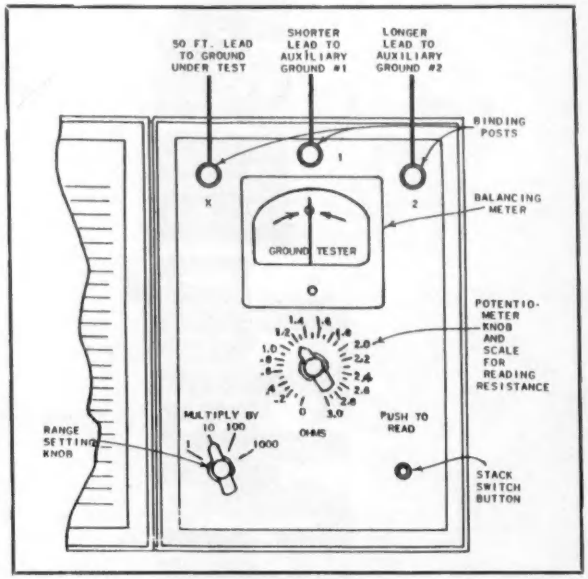

50 FT. LEAD TO GROUND UNDER TEST
SHORTER LEAD TO AUXILIARY GROUND #1
LONGER LEAD TO AUXILIARY GROUND #2
BINDING POSTS
BALANCING METER
GROUND TESTER
POTENTIO-METER KNOB AND SCALE FOR READING RESISTANCE
MULTIPLY BY 10 100 1000
PUSH TO READ
RANGE SETTING KNOB
STACK SWITCH BUTTON

FIGURE ONE

20 feet long and the other, 40 feet long. The probes are pushed into the ground by hand in locations as far apart as possible and as far away as practicable from the ground under test.

After the connections to the auxiliary and test grounds are made, pressing the "PUSH TO READ" button causes a vibrator to be excited by two No. 6 dry cells. One pair of vibrator contacts connects the

More Data For Your "SPEC BOOK" on page 59.

TELEPHONE ENGINEER & MANAGEMENT'S

PLANT MAN'S 'SPEC' BOOK

(4) Ground Resistance Test Set for Testing Grounds

dry cells alternately across the primary winding of a power transformer. This induces approximately 150 volts across the secondary which connects to binding posts "X" and "2" through the calibrated potentiometer. A voltage is generated across the potentiometer, directly proportional to the current through the ground rod connected to the "X" post bears a binding post.

There is no difference of potential between the slider and the auxiliary binding post "1", when the potentiometer is in a balanced position. The portion of the potentiometer between the slider and the ground rod connected to the "X" post bears a definite relation to the resistance from the test object to the ground.

This reading is practically independent of the resistances of the connections to binding posts "1" and "2." The reference grounds may have as much as 10,000 ohms without materially affecting the measurement of the ground under test. For maximum accuracy, a reasonably low resistance ground, however, is desirable for the reference ground where circumstances permit.

In using the set to take a resistance reading of a ground, proceed as follows:

(a) Make the required connections to the test and auxiliary grounds.

(b) Rotate MULTIPLY BY switch to "1,000" position. Set potentiometer knob (OHMS) on "3.0" position.

(c) Press push button *slightly* and observe swing of needle.

TELEPHONE ENGINEER & MANAGEMENT'S

PLANT MAN'S 'SPEC' BOOK

(5) Ground Resistance Test Set for Testing Grounds

(d) If the needle deflects to the right side of the meter dial, the resistance is within the measurement range of the instrument. If it deflects to the left, the resistance is greater than 3,000 ohms (3.0 x 1,000), the maximum range of the instrument.

(e) When the deflection is to the right, turn the OHMS knob slowly counter-clockwise until the needle is centered.

(f) If the needle does not center when the OHMS knob is turned to below ".2," the resistance is too high. Reset MULTIPLY BY knob to "100" and return the OHMS knob to the "3.0" position to repeat the steps in paragraphs (e) and (f).

(g) If necessary, repeat steps (e) and (f) with MULTIPLY BY knob on "10" and "1" to center the needle.

(h) After needle is brought to zero deflection, press button all the way for full sensitivity and adjust OHMS knob again for zero deflection of needle.

(i) Read the dial and multiply by the proper factor 1,000, 100, or 10, as indicated by the setting of the MULTIPLY BY knob to obtain the ground resistance reading.

Precautions in Using the Vibrator Type Ground Resistance Set

When taking the readings, depress the PUSH TO READ button only half way until the meter is near balance and then depress the button all the way for

TELEPHONE ENGINEER & MANAGEMENT'S

PLANT MAN'S 'SPEC' BOOK

(6) Ground Resistance Test Set for Testing Grounds

full sensitivity. This is important to prevent excessive swings of the needle. Excessive deflections may result in a bent needle or damage to the moving coil element. Such damage would cause inaccurate readings.

Before using the test set, check its condition in the manner illustrated in *Figure Two.*

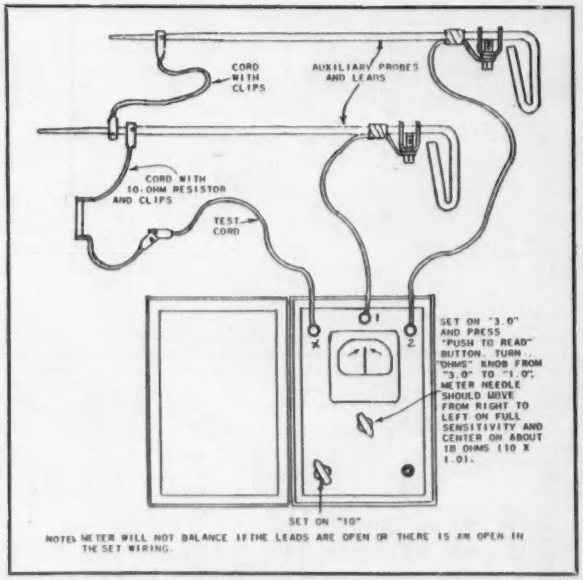

CORD WITH CLIPS
AUXILIARY PROBES AND LEADS
CORD WITH 10-OHM RESISTOR AND CLIPS
TEST CORD
X
1
2
SET ON "3.0" AND PRESS "PUSH TO READ" BUTTON. TURN "OHMS" KNOB FROM "3.0" TO "1.0". METER NEEDLE SHOULD MOVE FROM RIGHT TO LEFT ON FULL SENSITIVITY AND CENTER ON ABOUT 1Ω OHMS (10 X 1.0).
SET ON "10"
NOTE: METER WILL NOT BALANCE IF THE LEADS ARE OPEN OR THERE IS AN OPEN IN THE SET WIRING.

FIGURE TWO

More Data For Your "SPEC BOOK" In The Next Issue.

Fundamentals and methods for

Effective transistor circuit design

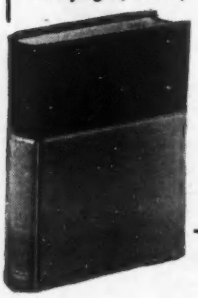
Here's how you can get a valuable knowledge of quantitative transistor circuit design, based on a sound understanding of the internal workings of the transistor device. This big transistor manual gives you step-by-step guidance to put you in complete command of practically every problem you run up against . . . the basic facts, fundamentals, and know-how to increase your knowledge and skill in working with transistor design and uses.

Just Published

TRANSISTOR ELECTRONICS

By David Dewitt, Manager, Component Engineering, I.B.M. Data Processing Division, and Arthur L. Rossoff, Assistant Chief Engineer, Engineering Products Division, Radio Recepter Co., Inc.

381 pages, 6 x 9, 185 illustrations, $8.00



- transistor properties and devices
- Physical mechanisms
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- circuit design and uses
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Senior Engineering Specialist, Applied Research Laboratory, Sylvania Electric Products, Inc.

319 pages, 6 x 9, 236 illustrations, $8.50

Guides you in —

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- finding a physical network yielding the desired rational-fraction approximation

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Please send me the book(s) checked below. My check is attached.

☐ DeWitt & Rossoff—Transistor Electronics—$8.00

☐ Storer—Passive Network Synthesis—$8.50

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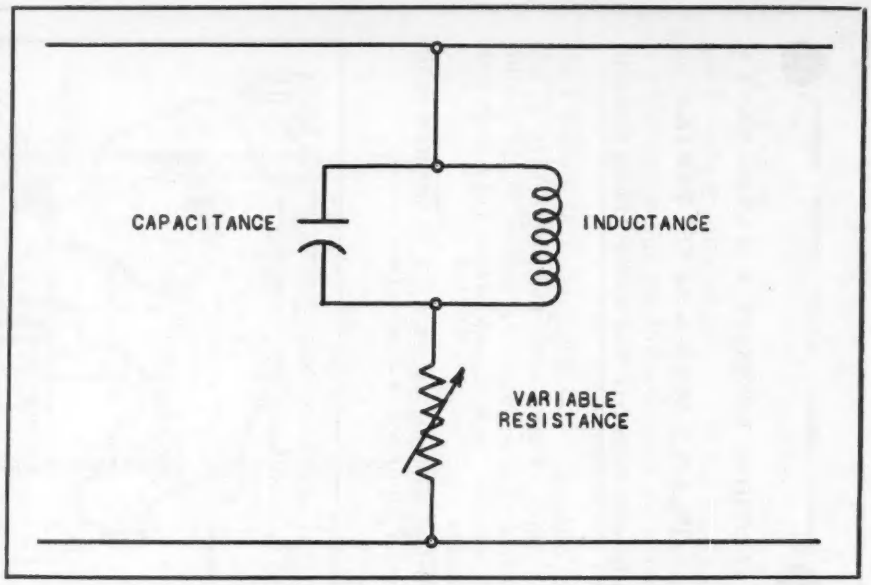
City .....Zone .... State .....
Company .....
Position .....
Prices Apply to U. S.



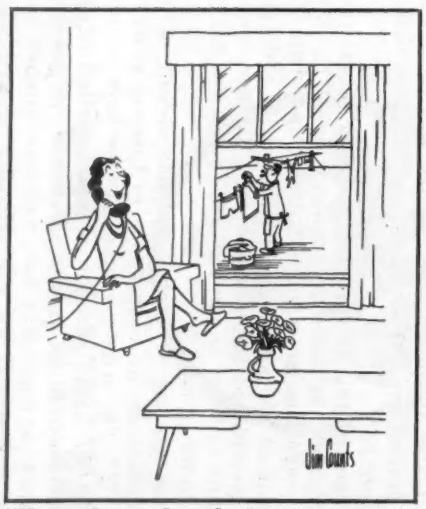
BASIC RLC circuit of an equalizer.

cision potentiometer, having a counter dial with a locking feature. The 1,000-ohm range of adjustment will prove sufficient for all but the occasional extremely short loop where the required equalization loss is slight. Provision is made for increasing the range by adding fixed resistors in series with the potentiometer to obtain an effective total of over 3,000 ohms. These additional resistors are controlled by a jumper connection on the left side of the equalizer inside panel. Provision is made for mounting fixed resistors of the 18 or 19 type when needed to lower the circuit Q.

After final adjustment is made and the equalization is completed, the counter dial lock is tightened and the final positions of the dials and switches are entered on a data card for future reference.

For application of a resistance within the LC tank circuit, a variable 50-ohm potentiometer can be temporarily included in the circuit for obtaining a value of resistance that will produce a resonant circuit Q to match a particular cable characteristic. When the proper value of the resistance has been determined, the potentiometer may be removed and a corresponding value of 18 or 19 type resistor mounted in the spare holes provided on the subassembly.

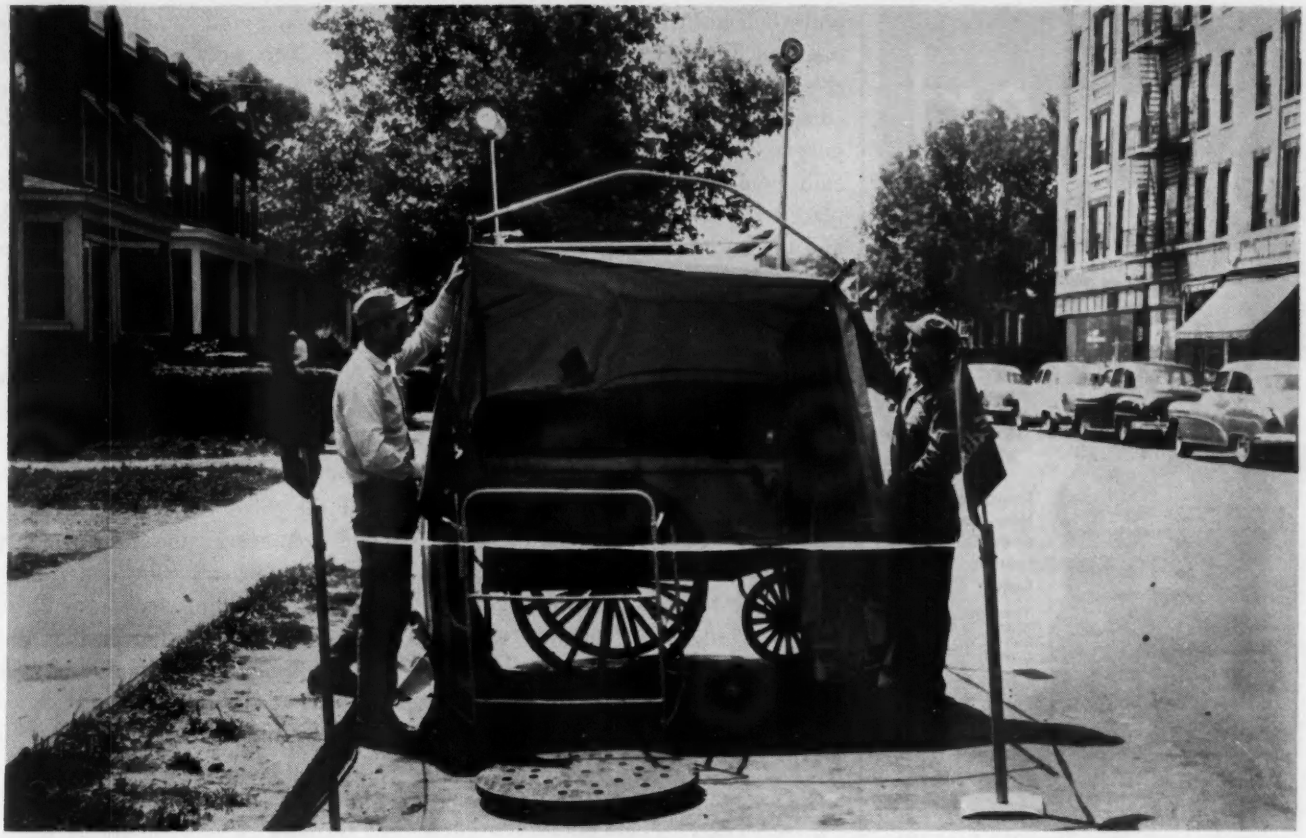
Variations of the universal equalizer are available to meet specific telephone company requirements. The equipment will fit the standard 19-inch rack used in central offices. However, a wall mounting bracket and dust cover is available for installations where standard rack mounting is not desired, such as at a studio location. The dust cover attaches to the wall bracket. The brackets feature a down swinging hinge arrangement for easy access to the rear of the equalizer for installation or line up modification of the LC circuit.



"He works on the telephone company's line 5 days a week and on mine Saturdays!"

Vinyl Plastic Tarpaulins For Overhead Protection

TARPAULINS of orange colored vinyl plastic sheathing laminated to both sides of a nylon fabric is a new way of providing protection for workers and equipment from weather. As shown at right, the vinyl sheathing is spread over a metal framework set



Krene nylon-vinyl-plastic tarpaulin is orange colored for high visibility in street areas. (Bakelite Co., Division of Union Carbide Corp.)

over a manhole. The orange-colored covering is quite distinctive and can be readily seen from a long distance in the day time. At night, a lantern inside the tent illuminates the covering from the inside and the resulting diffused lighting supplements blinker lights to serve as a warning to drivers of motor vehicles.

The vinyl plastic sheathing is said to have excellent resistance to moisture, oil, greases, alcohols, and corrosive chemicals, reasonable flexibility in cold weather, and the folds will not stick together on hot days. The nylon and vinyl plastic combination is strong, long wearing, resists abrasion, tearing, cracking, and will not burn readily. Tarpaulins made from this material will stand considerable use. Because of the resistance of the material to fungus and mildew, the tarpaulins can be folded and stored in damp locations without danger of rotting.

The nylon-vinyl plastic tarpaulin can be easily cleaned by wiping with a damp cloth. Repairs of punctures such as those due to a sharp tool or wire ends can be easily made by means of an adhesive and a plastic patch.

The tarpaulin illustrated measures 12 ft. x 18 ft. and weighs 25 pounds. It folds into a lightweight compact bundle. Grommets are provided around the edge at two-foot intervals for fastening.

QUESTION: — What would be practical locations for an outdoor telephone booth?

ANSWER: — The best way to ascertain if a location is suitable for an outdoor booth is to make surveys at periodic intervals. The right location, of course, is where people need this kind of service. In large cities, where people have to walk in going from one place to another, the most profitable locations are at the points where pedestrian traffic is heavy. In the suburbs, and in smaller towns, there will be more people using passenger cars, so the surveys should determine locations such as drive-in establishments. Drive-up type booths can be provided in some of these locations or at curb lines nearby.

QUESTION: — Is it possible to splice cable conductors by means of compression sleeves in the same manner as for open-wire conductors?

ANSWER: — When PIC cable (polyethylene jacketed cable with

Stewart

TEST EQUIPMENT

COMMUNICATIONS TEST SET MODEL JK.

Transistor Oscillator, Communications D B Meter; Leather carrying Case.

Transistor Oscillator, Model J: For checking and locating trouble in audio frequency and carrier systems. Sine wave output 0, —13, —16 D B M 1,000 cycles into 600 ohm line. Output impedence 600 ohms. **Communications D B Meter,** Model K. Frequency band, 60 cycles to 600 K C with no correction. Reads accurately on unsymetrical and sine waves. D B M readings, —20 to +40 in RED: Volt ranges 0 to 1, 5, 25 and 125 in BLACK. Internal loads 600 and 150 ohms. **Leather Case,** 3 compartments for Testers and Leads. Either Model J or Model K may be purchased separately.

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polyethylene insulated conductors) is installed, the conductors can be successfully spliced by means of special compression sleeves made for this purpose. Instead of the conductor ends being butted together, they are placed side by side inside the sleeve and the latter is compressed with the same type of compression tool that is made for drop wire splicing sleeves. Filled type plastic insulating sleeves are used to insulate the splices afterwards.

QUESTION: — *In one town that we serve, the low parts are frequently flooded. Whenever a flood threatens, we have to send men in to disconnect the telephone instruments and bring them to the storeroom until the river level falls and then we have to reinstall them. Hasn't something been developed to make this costly work unnecessary?*

ANSWER: — One solution would be to install desk type instruments with plugs and jacks and arrange for the subscribers in a flood prevalent area to disconnect their instruments when a flood appears imminent and take the telephones with them or leave them in an upstairs room. The Ohio Bell several years ago, installed waterproof housings with screw-on covers for the station jacks to keep out water and silt in flood areas. Results were highly satisfactory to both the plant people and the subscribers. As for the station wiring and protectors, we would advise the use of bridle wire (neoprene jacket over rubber insulation) and outside type protectors placed high enough on the building wall outside to be out of reach of the flood waters.

EDITOR'S NOTE
Got a problem?? Write it down and send it to John S. Reed, Technical Editor, "Telephone Engineer & Management," 7720 N. Sheridan Rd., Chicago 26, Ill. We'll do our best to give you the correct answer.

QUESTION: — *We have a request to serve a new industrial plant about a mile and a half out in the country. This firm needs* 12 *circuits. We already have a four crossarm lead going by about* 300 *feet from this location and cannot add more circuits without setting taller poles. What do you suggest will do the job as cable would be pretty expensive? There are* 18 *circuits in the lead so we would need* 30 *circuits altogether.*

ANSWER: — It is recommended that you remove the lowest crossarm of wires and install 16-pair, 19- or 22-gauge multiple distribution wire below the third remaining crossarm. At the pole nearest the industrial site, you could extend the distribution wire to the building and deadend the support wire there. After determining how much of the building run would be required to reach the protector bank, the support wire could be cut and removed, leaving the conductors to be laid in bridle rings to the building terminal, which should be of the protected type. Multiple distribution wire is generally less expensive than cable from a construction standpoint. Maintenance of multiple distribution wire is reported to be quite low.

QUESTION: — *A great number of telephone companies have been conducting a program of chemical spraying to eradicate trees and brush along right-of-ways. How should the spraying work be tapered off for permanent eradication of unwanted growths?*

ANSWER: — After the second major spraying operation, men assigned to routine maintenance of rural outside plant should be provided with three-gallon hand sprayers mounted in a suitable location on their trucks. The sprayer tank is filled with an oil solution of a herbicide mixed in proportions recommended by the manufacturer of the herbicide selected. As these men drive by open-wire leads in the course of their work, they should be on the lookout for sprouts that may later regrow into overhead wires. An application to the basal (lower) bark of the sprout from the ground line to about one foot up will destroy the plant.

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DEPT. E-1

Busy Year For Electronics

(Continued from page 36)

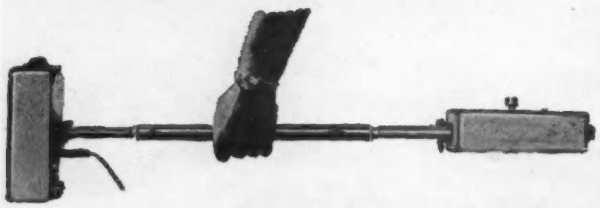
reduced to a mere trickle by keeping the transmitter tube filaments turned off until the mobile subscriber equipment is in off-hook condition. The delay incurred in waiting for the tubes to warm up is generally tolerable.

General Electric's new portable mobile telephone employs a transistor receiver more compact than a small cigar box. It is packaged in a hand-carry type enclosure with a tube-type transmitter and is powered from self-contained batteries. Its design permits its use on the ground, inside a building and when carried by a person. It may also be used in vehicles. Since no installation is required, it may be moved from one vehicle to another. As it is, it can be used in radio dispatching services and in mobile telephone applications where selective signaling is not employed. By adding an external decoder, the new GE portable can be used compatibly in mobile telephone systems employing Bell System two-tone coded signaling.

RCA went even a step further in portability when it introduced its Personalfone "belt" radio. It consists of what looks like two camera cases suspended from a belt. One case contains an all-transistor receiver, the other a tube-type transmitter. The battery pack provides enough power for 2000 average transmissions.

THE NEW MINIATURIZED WILKINSON LINE LOCATOR MODEL W-3

This radically new, powerful transistorized locating instrument weighs only 4 pounds and is ¼ as large as old type pipe locators.



It's as handy as a flash light. The transistors rarely, if ever, require replacement; non-leak mercury cells outlast old type batteries at least ten times. The instrument cases are molded glass fibre. The aluminum connecting handle telescopes to 17 inches, and the entire instrument comes in a substantial carrying case.

Write today for illustrated brochure and instruction manual.

WILKINSON PRODUCTS CO.

3987 Chevy Chase Drive,
Pasadena 3, California
SYlvan 0-4314

DuMont introduced a one-cabinet repeater for extending the range of mobile telephone systems by means of a cross-over relay link. Ordinarily, the repeater transmitter and receiver are housed separately. It can be equipped with a receiver for the 25-54, 152-174 or 450-470 megacycle band and a transmitter for operation in any of these bands. The transmitter and receiver should operate in different bands, however. For instance, the receiver may be for the 450-470 mc band and the transmitter for the 152-174 mc band.

Kaar introduced the first 450-470 mc band mobile telephone to be priced under $500. Heretofore, all other brands sold for $700 or more for a mobile unit. Kaar's new TR500 has a lower powered transmitter but talks 85% as far as higher powered, more costly sets. Transistors are used in the power supply instead of vibrators or a dynamotor.

1958 saw more companies enter the mobile radiotelephone field. Lenkurt introduced Mobiltel, a line of mobile radio equipment designed specifically for common carrier telephone applications. International Crystal Manufacturing Company and Morrow Radio Manufacturing Corp. are among the new entries. The famous Link radio line was taken over by Gonset.

The most spectacular development in mobile telephones in 1958 was the actual installation of equipment which enables extension of full dial service to mobile telephone subscribers who can dial into an automatic dial system, as well as be signaled in response to direct dialing by another subscriber. While still in its infancy, it is expected that mobile dial telephone service will be expanded and eventually integrated into direct-distance-dialing systems.

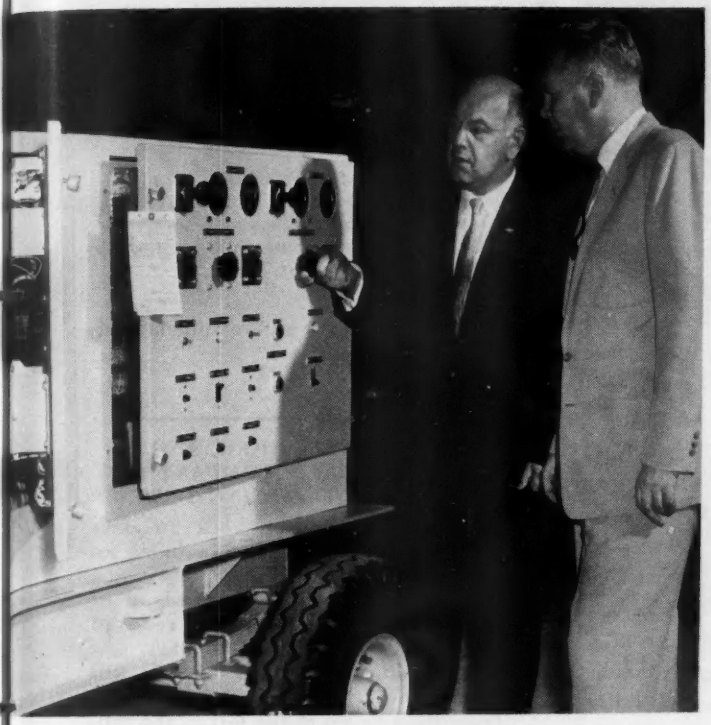
Another source for mobile telephone decoders became a reality in 1958 when Secode introduced its RPD-801 two-tone decoder which is fully compatible with the Bell System's MTS standards and is intended as a replacement for the Western Electric VS-1. The new Secode decoder is capable of a much larger number of dial code combinations than its predecessors.

Much progress was made in 1958 in the development of antennas for central office radio stations and mobile telephones. For the 450-470 MC band, Andrew Corporation developed a vehicular antenna with 3 db gain which is no larger than the conventional 152-174 MC band and 18-inch vertical whip. Because of its omnidirectional 3 db gain, the new antenna has the effect of doubling the rated transmitter power which can mean the difference between solid and spotty coverage.

Tele-Beam Industries introduced a new tunable vehicular antenna called the Magic Wand. Ordinarily, the radiating element of a conventional antenna is cut to an arbitrary length so that it will function within a specified band of frequencies. The new Magic Wand, however, has two telescoping sections. It can be tuned precisely to the desired frequency by varying its length and locked in place with an Allen set screw. A base loading coil is used which makes it possible to keep the radiating element about 50% shorter than for con-

ventional antennas. This improves appearance and reduces the opposition of those mobile subscribers who object to the installation of a mobile telephone antenna on the family car.

Much progress was also made in the development of directional central office radio station antennas. Tele-Beam, for instance, brought out a dual Yagi array which can be focused so that it sends the strongest signal (10 db gain) in one direction. It can also be



EDWARD P. SCHINMAN, president of Bogue Electric Mfg. Co., describes the controls of a new mobile power supply to ROBERT HERWIG (right), a vice president of the firm which has developed new transistor power supplies applicable to the telephone field.

used to squirt a strong signal into two different directions (5 db gain in each direction) in a well-eyed manner. This kind of an antenna can solve the coverage problems of mobile telephone systems in communities in mountainous areas. Sometimes, most effective results are obtained by aiming the signal at the side of a mountain which acts as a reflector and splatters the signal into the canyons and beyond obstructions.

In flat terrain where communication in all directions is required, an omnidirectional antenna is essential. Power gain in the antenna is nice to have since it is obtained without increasing operating cost in terms of electrical power consumption. The Andrew type 3000 antenna for the 152-172 MC band compresses vertical radiation to provide 6.3 db gain in all directions. While fairly expensive compared to lesser antennas, there is no cheaper way to get the effect of considerably higher power — plus added receiver sensitivity.

Power Supplies

A NEW SOURCE of power, the "fuel cell" was developed in 1958 and it holds great promise for the telephone industry. The fuel cell utilizes 100% of its fuel and has an energy conversion efficiency of 70% or better. Experimental fuel cells already made in Lockheed's laboratories produce 100-watt-hours of power per pound.

According to Lockheed officials, a 150-watt-hour fuel cell could produce enough energy *to power every type of aircraft or spacecraft!* This is far more power than required for most conceivable communications applications. Within five years, Lockheed scientists predict that fuel cells powerful enough to operate automobiles and aircraft can be developed. *Fortune* magazine (January, 1959 issue) predicted that actual applications of fuel cells will be a reality in the early 1960's. Imagine what such a device can mean as a source of power at isolated microwave repeater stations as well as at exchanges.

A big step forward in battery-type power supplies has already been made through refinement of the nickel-cadmium battery now being used for powering hearing aids and transistor radios as well as for starting jet aircraft. They are a big improvement over lead-acid batteries. They function well in cold weather. Their discharge current capabilities are phenomenal. One nickel-cadmium battery expert told the writer that they have developed a battery that can be fully discharged in 40 seconds and recharged in the same amount of time.

DC power supplies using transistors and semiconductor diodes came to the fore in 1958. The once-popular selenium rectifier is having to take a back seat in new designs. But, the transistor is not a cure-all, and as yet, is not useful for full applications. Premature conclusions to abandon all other types of power supplies should be avoided. Many power experts still contend that the motor generator set is the most reliable and least costly source of power on a long term basis.

But, the future of the transistor power supply looks extremely bright. A big step ahead is a new silicon transistor capable of handling 15 amperes and blocking 300 volts which is scheduled for production this spring. In the forward current direction, the resistance imposed by this new transistor is in the order of a few hundredths of an ohm.

Solar power is no longer news. The work of Bell Labs and Hoffman Electronics in this field has already received wide publicity. But, in 1958 it became a commercial reality. It is now possible to buy solar cells over the counter. They are already being used for powering portable radios, hearing aids and industrial machine controls. — *To Be Continued.*

EDITOR'S NOTE

Part II of Mr. Sands' article on electronic developments will appear in the April 1 issue. It will discuss: (1) Electronic Testing Instruments; (2) Component Developments; and (3) Electronic Traffic Control Systems.

"Pro's" And "Cons" of Cycle Billing"

(Continued from page 38)

tions exist. Billing personnel must be well briefed on scheduling to avoid costly delays in work, until they have sufficient experience to become adjusted to the routine. Furthermore, cycle billing does not completely do the job of smoothing out the work scheduling, because of the odd number of days in the month.

The company with which the writer is connected, for example, follows a 3-cycle arrangement, with bills dated the 1st, 11th, and 21st of each month. For example, in September, 1958 (omitting Labor Day from consideration), one cycle will have only six working days available for billing personnel to do their work but another one will have eight — 1/3 more working time, simply because of the arrangement of the calendar.

"ACCOUNTING NOTES"
To keep up on telephone accounting methods read TE&M's new feature — "Accounting Notes," by Gardner M. Jones. See page 50 of this issue.

It is also very difficult to get three groups of exchanges which fit some administrative pattern and still have approximately the same number of subscribers. All this is an indication that cycle billing can go only so far in keeping billing work scheduled evenly. It can get it approximately so, and no more.

These complications extend beyond the billing work and into the area of general accounting. For example, toll revenue summaries from cycle billing are more difficult to reconcile with a toll settlement than would be the case if all toll billing were from the 21st of one month until the 20th of the next month. If CLR reports or other records of toll traffic need to be checked, much reconciling is required.

With regards to the revenue and accounts receivable records on our General Ledger, our Company also has additional reconciling or special treatment to do because of following cycle billing. Some of this reconciling and adjusting is made only once each year, at the time an annual audit is made of the books of accounts.

If the accountant making the audit has only a theoretical knowledge of cycle billing, the reconcilations and adjustments to be made can add considerably to his work. The adjusting entries which he makes will be, of course, as of the end of the fiscal year, but the resulting general ledger balances will appear for an entire 12 months on all monthly balance sheets. If the revenue of the company changes considerable during those 12 months, these figures can be quite misleading.

Reference was previously made to the care which must be exercised in any re-arrangement of billing cycles. For this reason, thorough consideration should be given to all forseeable factors when a cycle arrangement is being set up or being rearranged. Rearrangements should be kept at an absolute minimum, because of all the adjustments involved. Such rearrangement requires the fullest cooperation between the Accounting Department and the Commercial Department.

At the time the re-arrangement referred to above was being done, our company utilized inserts to keep customer confusion down to a minimum. Below is a sample of the insert which was mailed with subscriber's bill *before* the re-arrangement was made:

YOUR NEXT BILL WILL COME AT A *DIFFERENT TIME* OF THE MONTH

The increase in the number of telephone users in our Company has made it necessary to revise most customer's billing dates. During this changeover period you will receive a bill covering 10 days more than the 30 days. We will date your bill 10 days later than usual. This accounts for the additional 10 days billing.

Your next statement will be dated the *21st*. Future bills will be received about the same time each month.

We hope this change in your billing date will not cause you any inconvenience.

At the time the bill referred to in the above notice was actually mailed out, another insert was included, reading as follows:

"They're going to cut over to dial tonight."

TEXAS TELEPHONE AND TELEGRAPH COMPANY
CHANGE OF BILLING DATE

Due to dating your bill *10* days later than usual, we have included an additional *10* days billing.

Future bills will be received on or about the date this bill was received and will cover the usual 30 days.

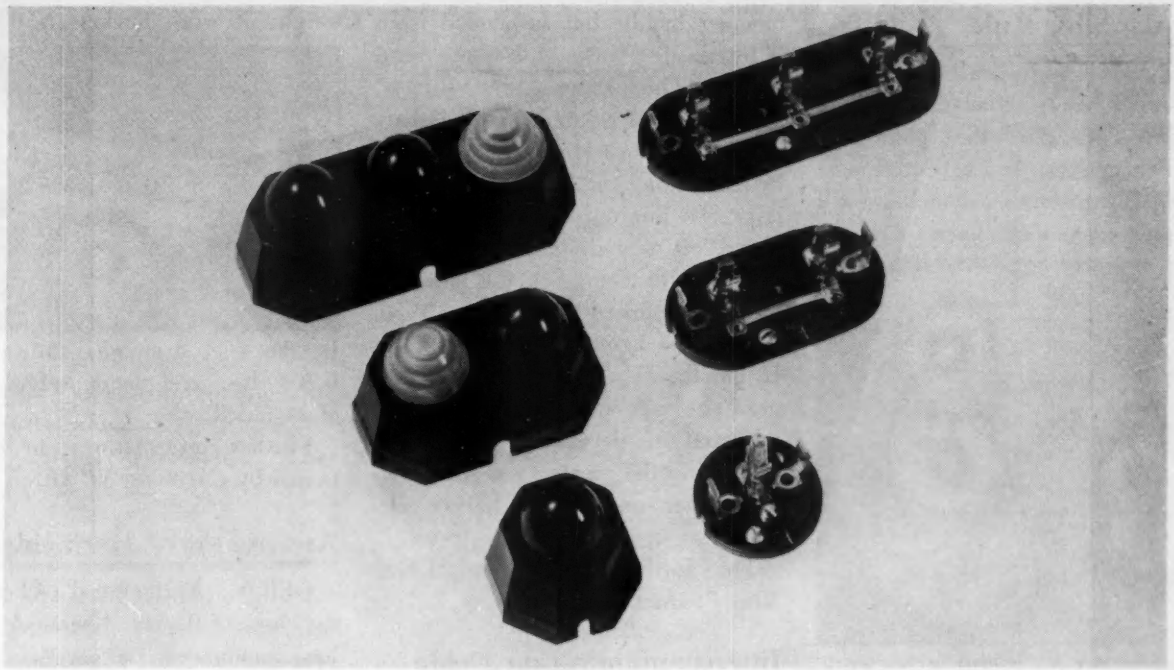
As usual, payment of this bill will be due and payable within 10 days from date shown at the top of the bill.

TEXAS TELEPHONE AND TELEGRAPH COMPANY

At the same time such inserts were being prepared and mailed out, our Commercial Manager was thoroughly informing our District Managers and all commercial personnel of what was being done and why it would be an improvement.

These complications are not described for the purpose of persuading anyone from using cycle billing. To a considerable degree, they are a normal part of accounting and management problems. It should be clear, on the other hand, that the use of cycle billing does require careful management if its advantages are to be utilized to the fullest extent, and are not to be more than offset by its disadvantages.

If this careful forethought and coordination of work is present, cycle billing can be a valuable method of improving work and reducing expense.—*B. W. Barnett.*



Suttle Equipment Corporation's New Series of Telephone Indicator Lamps.

NEW PRODUCTS' SHOWCASE

By DICK REYNOLDS

Telephone Indicator Lamps

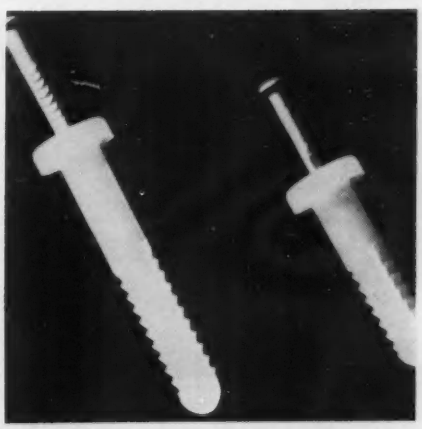
NOW AVAILABLE from Suttle Equipment Corp., to Independent telephone companies, intercommunications concerns, and manufacturers, are the new series of indicator lamps, S.E. 15, S.E. 17 (two lamp), and S.E. 18 (three lamp). Used in business offices, hospitals, factories, mills, and residences, these new lamps provide a *visual* signal so that calls are not interrupted and privacy is maintained — or for any desired visual signaling.

They use any standard switchboard lamp and serve as switchboard visual signals as well. Available in one lamp units (S.E. 15 — white, ruby, or green lens), two lamps units (S.E. 17 — in three possible lens color combinations), and three lamp units (S.E. 18 — white, green and ruby or other combinations of these colors), they may be used with or without concealed wiring. Suttle indicator lights are holed for fixed mounting by means of wood screws, or, surface placed. A cord stay hook screw is included on jack base. Bright color break-resistant beehive plastic lenses are used and lenses can be easily changed because provision is made for easy screw-set lens changing. For further information, *Check New Product* 146.

Nylon Expansion Anchors

ROBERT Q. Partridge Products, Inc., has announced new Tap-It Nylon Expansion Anchors that are scientifically designed and tested to secure everything to anything in less than one-fourth the time. Any assembly or part used in construction, electrical installations, plumbing and air conditioning, can be securely fastened to masonry, cinder block, wood, glass, metal, tile, or plastic surface with the anchors. Anchor size hole is first drilled, anchor inserted and tapped in. Pin expands anchor which then exerts holding power. No special tools are needed.

The Tap-It Nylon Anchor will not rust or corrode, is not affected by



atmospheric conditions, and nonconductor of electricity.

The anchors are available in either round head or flat head in three sizes: 3/16″ x 1″, ¼″ x 1″, and ¼″ x 1½″, complete with pin, packed one hundred to the box. For further information, *Check New Product* 147.

Circular Slide Rule

GENERAL Industrial Co. has introduced a handy circular Slide Rule for engineers and other plant and office executives. Any executive who must perform simple calculations will find this convenient, pocket-size cal-

culator extremely useful in his work.

Operation of rule is simple and results are accurate. To multiply, divide and find proportions is easy and fast with this circular rule. Complete easy-to-follow instructions will be included with each slide rule.

For further information, *Check New Product* 148.

New Impact Hammer

A NEW TYPE hammer, which absorbs much of the impact shock, is being introduced by Ramset Fastening System, Olin Mathieson Chemical Corp. The new hammer eliminates much of the fatigue of hammer-in work.

Of radically new design, head of hammer is not rigidly connected to hammer handle but suspended from it by elastic shocks within the head housing. These shocks, or "O-Rings," are made of a resilient material having energy absorbing qualities. It is by suspending the hammer head that impact is minimized. Called "Shure-Drive," it was designed specifically for use with Shure-Set, the hammer-in tool introduced by Ramset in 1956.

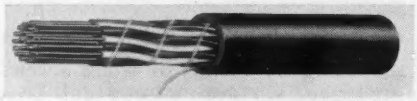
The new hammer is the result of 18 months of research and field testing. The task was approached with the goal of developing a hammer combining the greatest possible striking power and fewest fatigue elements.

For further information, *Check New Product* 149.

Intercommunication Cable

A NEW intercommunication cable with color-coded paired copper conductors in size No. 22 AWG, suitable for inside telephone wiring, has been announced by General Electric's Wire & Cable Dept.

The cable is available in stock in conductor pairs of 6, 11, 16, 26, and 51. Insulation is Flamenol (polyvinyl chloride) which provides permanent, solid color-coding so that

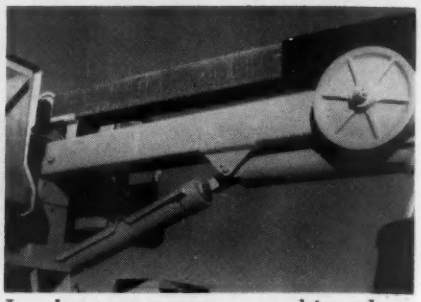


each pair can be readily identified and selected from all other pairs in the cable. Over-all jacket is a tough Flamenol which permits normal stapling of cable to walls or baseboards without damage to cable. Stripping is made easy by use of a nylon rip cord under jacket. For further information, *Check NP* 150.

Insulating Fiber Glass Section

A NEW insulating fiber glass section has been added to the upper arm of Holan Corporation's aerial elbow as an additional safety feature. The fiber glass section and controls recently withstood 100,000 volts for one minute in a ground-to-work bucket test.

In a separate strength test, the fiber glass section proved to have a safety factor of 7. Combined nominal 600-lb. capacity of the elbow and weight of work buckets is 800 lbs.



In the test, arm was subjected to 6,200 lbs. end load before fiber glass failed.

Further information can be obtained by *Checking NP* 151.

Atrazine 50W Herbicide

GEIGY Agricultural Chemicals, division of Geigy Chemical Corp., has announced the availability of Atrazine 50W herbicide for nonselective or industrial weed control on non-cropped land.

The new triazine compound, a 50% wettable powder, controls annual broadleaf weeds, grasses, and many perennial weeds. It may be

applied not only before weeds emerge but also within several weeks following weed emergence. The new compound is a valuable addition to Geigy's Simazine 50W herbicide, previously introduced for industrial weed control two years ago, which was intended principally for application from late fall to early spring. Atrazine 50W, is effective from late spring through early summer, thus giving a complete year-round program for industrial weed control.

Although there is some herbicidal activity through foliage contact, Atrazine 50W acts mainly through the roots. Therefore, it is dependent upon adequate rainfall to carry it into the root zone.

Atrazine 50W is low in toxicity to man and animals and does not require the use of special protective clothing. It is non-flammable, low in electrical conductivity, non-corrosive and easily flushed from sprayer equipment with water.

For further information, *Check New Product* 152.

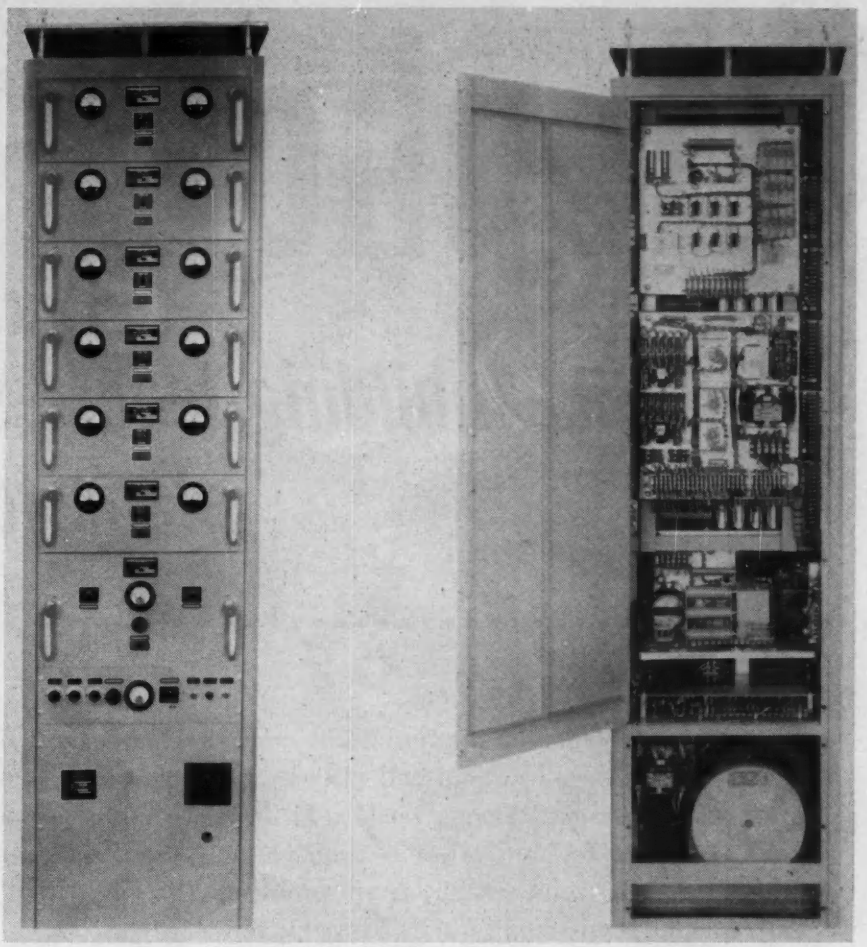
Computer Power Supply

SIX DIFFERENT DC output voltages, electrically isolated from each other, and two AC outputs, one regulated and one unregulated, are provided by a computer power supply system developed by Bogue Electric Manufacturing Co., in which line transients are eliminated and transients caused by step load changes are minimal.

A total of 4.75 KW DC is provided by the power supply system which is available from six individual rectifier power supplies. Overall voltage regulation is better than ±3% from 40 to 100% of rated load. Ripple and noise are less than 0.25% peak-to-peak. Dynamic regulation is better than 2% for step load changes from 40 to 60% or 60 to 40% of rated load.

Two AC outputs are provided. One KVA of unregulated 60-cps AC at 105-125 volts is provided by one of the AC outputs. The other AC output furnishes one KVA of 60-cps AC, regulated to ± 1% for any load condition from 40 to 100% of rated load and with line voltage variations between 182 and 216 volts. The regulated AC output may be adjusted to any value between 90 and 120 volts.

The six individual rectifier power supplies are fed by a 3-phase, 400-cps AC motor generator which is an integral part of the power supply system. A magnetic amplifier provides close regulation of generator output voltage. Large storage capacitors in each DC power supply minimize transients caused by step loading changes and line transients are eliminated by using a motor generator set to isolate the rectifier units from the power line.



Bogue Electric Mfg. Co's. New Computer Power Supply.

Each of the DC power supplies is mounted in individual drawers which fit a standard 19-inch relay rack. Regulators, controls and protective devices are also mounted on standard 19-inch panels. The motor generator set is mounted at the bottom of the single power supply cabinet.

Overload protection is provided by fuses in all output circuits. An interlock system automatically disconnects all outputs from their loads in case of overvoltage or undervoltage at any of the DC outputs. In case of loss of input power, the equipment is automatically shut down.

This power supply, which meets the requirements of MIL-E-4158B specifications, can be produced in almost any combination of voltages specified by a purchaser and in power handling capabilities from less than one KW to 150 KW or more. For further information *Check NP* 153.

READER'S SERVICE DEPT.

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■ **Please send me information on the following New Products: — (Check Items Wanted)**

NP 146..... NP 147..... NP 148..... NP 149..... NP 150.....
NP 151..... NP 152..... NP 153.....

Telephony is go

LENKURT "building-block" system plans for your growth

TELEPHONE companies are installing microwave to obtain additional toll circuits for several good reasons. Among them: (1) It is quick, easy and economical—(2) requires no right-of-way—(3) solves tough terrain problems —(4) is simple to maintain—and (5) highly reliable—more weatherproof than other facilities.

And experienced telephone people are choosing Lenkurt *Microtel!* That's because it's the most advanced microwave equipment on the market and the most flexible in design to meet future growth requirements. Consider the rate of toll growth and you'll see how important this is!

Simple plug-in units

With flexible Lenkurt 45BX Carrier, a system can be installed initially with only a few carrier channels. Then, as traffic increases, it can be expanded economically at will by the addition of more channelizing equipment or by paralleling transmitter-receiver assemblies.

All plug-in units of Type 74A Microtel are similar-to those in the famous "universal" Lenkurt 45-class equipment. This greatly simplifies maintenance.

Start small, if you wish, with as few as 4 to 12 channels. Later on you can add 12- or 24-channel groups on a stackable basis. A single *Microtel* terminal can accommodate up to 240 channels; and with r-f circulators, *as many as four systems can use the original antenna and antenna transmission line!* For complete information, send the coupon or call your nearest Automatic Electric representative.

Automatic Electric Sales Corporation
Northlake, Illinois ***(Att.: T. B. Collins)***

Please send booklet describing new Lenkurt Microtel System.

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

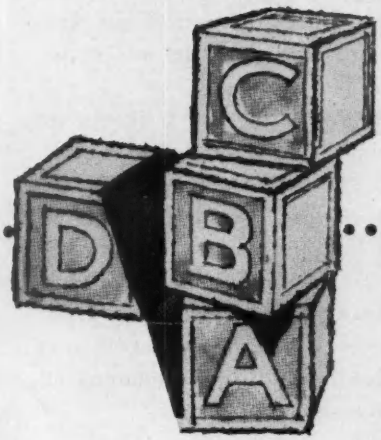
CITY..... ZONE..... STATE.....

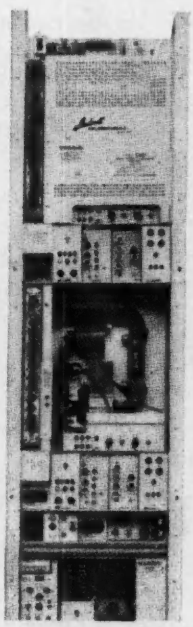
In Canada: Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ontario.

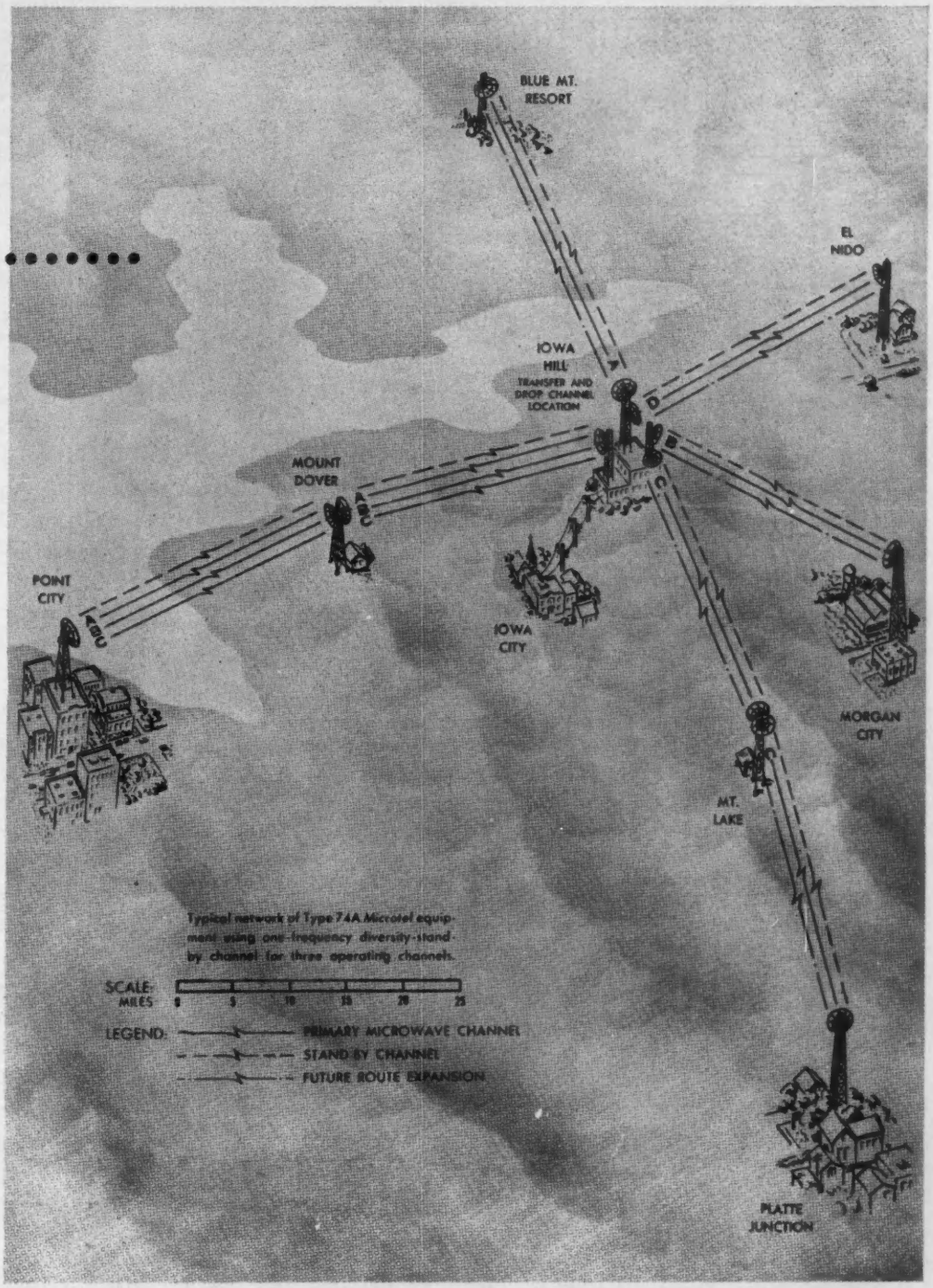
New 6,000 mc. **microtel** Type 74A

Designed to save space (2 systems can be mounted on a single rack) and use less power (only 360 watts per system), new Lenkurt *Microtel* Type 74A provides high-quality, broad-band microwave transmission facilities in the 6,000 mc. region. *Microtel* is equally satisfactory whether the need is for only a few circuits or for a high-density network with 720 voice channels (three operating r-f channels with one stand-by on a common antenna). As many as 960 voice channels can be supplied on 4 operating r-f channels. It is available from Automatic Electric as a complete package — *engineered, furnished and installed* — on one order.

ing microwave!







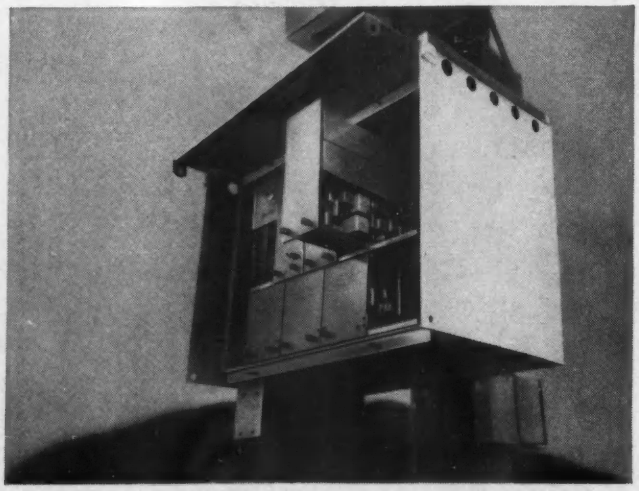
Typical network of Type 74A Microtel equipment using one frequency diversity-stand-by channel for three operating channels.

AUTOMATIC ELECTRIC

Subsidiary of **GENERAL TELEPHONE**

New Kellogg K-31 Carrier System

Ideal for Rural Subscribers



Kellogg's new K-31 rural subscriber carrier system provides telephone companies with toll quality subscriber carrier at low cost. The system is completely transistorized, features printed circuits, miniaturized sub-assemblies and plug-in construction.

Standby power, consisting of two small batteries and a transistorized charger in a pole-mounted housing, is available. This is possible because power consumption is less than three watts even during talking.

K-31 has built-in compandors to assure quiet talking circuits and is automatically regulated to eliminate the effect of changing weather conditions over a wide range of carrier line losses.

Line-up and test procedure is very simple—a single level control for each direction of transmission. Terminating telephone type jacks are provided for ease and speed in testing. Installation time is held to a minimum by the use of a unique pole-mounted housing with built-in protected terminal blocks for external connections.

These design features plus top quality components and workmanship make K-31 reliable and stable in its operation.

Ask your Kellogg sales representative for full details.

KELLOGG Communications Division of IT&T
CHICAGO, ILLINOIS

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Illinois. Communications Division of International Telephone and Telegraph Corporation.

Regional Offices and Warehouses: See two-page Kellogg advertisement pages 6-7 for complete listing.

Jones Promoted To Chief Engr. Cuban Tel. Co.

AUGUST F. JONES has been promoted to chief engineer of the Cuban Telephone Co., Havana, Cuba, an operating company of the International Telephone & Telegraph Corp.

Jones joined the ITT System in 1925, following graduation from Cornell University with a degree in electrical engineering. He had previously been granted B.S. and M.S. degrees from Denison University, Granville, Ohio, where he was elected to Phi Beta Kappa.

In 1925-1926 he was a student engineer for the Cuban Telephone Co. and successively, for 14 years following, an engineer for the Spanish Telephone Co. and for ITT's Standard Electric Co., Madrid. In 1950 he was a member of an ITT advisory group to Greece which aided that country in rehabilitating and expanding its telecommunication system.

Prior to his promotion, Jones was an executive engineer at ITT Laboratories, Nutley, N. J., and had been a member of the Laboratories staff since 1955. He is a member of the American Institute of Electrical Engineers and serves on its communications switching systems committee.

Carolina T. & T. Announces New Appointments

TWO APPOINTMENTS to positions within the general commercial office at Carolina Telephone & Telegraph Co., Tarboro, N. C., have been announced.

W. W. Aycock has been named special services manager and E. P. Kittinger has been named general commercial supervisor.

Aycock was formerly general commercial staff assistant. Kittinger was recently assigned to the commercial department following work in setting up the plant sales program in the Plant Department.

J. G. Kreamer Heads United Tel. Groups

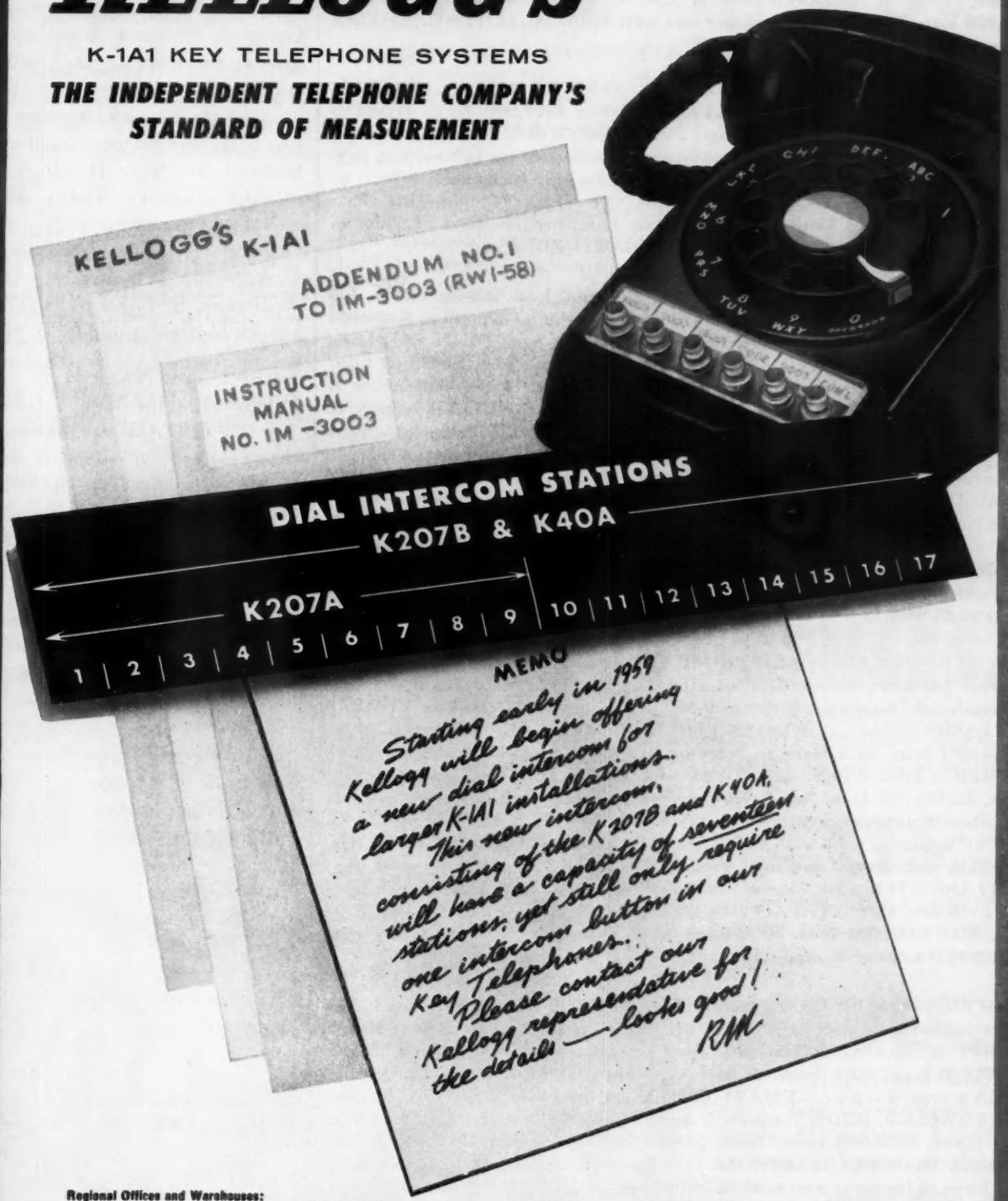
AT THE recent annual meetings of the companies J. G. Kreamer was elected president of the United Tele-

Please turn to page 74

KELLOGG'S

K-1A1 KEY TELEPHONE SYSTEMS

THE INDEPENDENT TELEPHONE COMPANY'S STANDARD OF MEASUREMENT


KELLOGG'S K-1A1
ADDENDUM NO. 1
TO IM-3003 (RW1-58)
INSTRUCTION
MANUAL
NO. IM-3003
DIAL INTERCOM STATIONS
K207B & K40A
K207A
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17
MEMO
Starting early in 1959
Kellogg will begin offering
a new dial intercom for
larger K-1A1 installations.
This new intercom,
consisting of the K207B and K40A,
will have a capacity of seventeen
stations, yet still only require
one intercom button in our
Key Telephones.
Please contact our
Kellogg representative for
the details — looks good!
RM

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OXford 7-5780

GEORGIA
1594 Southland Circle, N.W.
Atlanta 18, Georgia
SYcamore 4-2441

ILLINOIS
4600 So. Tripp Ave.
Chicago 32, Illinois
CLiffside 4-4300

KANSAS
7th & Sunshine Road
Kansas City 15, Kansas
MAyfair 1-4418

MINNESOTA
6100 Excelsior Blvd.
Minneapolis 16, Minn.
West 9-6715

NEW YORK
327 North West Street
Syracuse, N.Y.
HArrison 2-2951

OHIO
1555 W. Fourth Street
Mansfield, Ohio
LAfayette 4-6511

TEXAS
1515 Turtle Creek Blvd.
Dallas 7, Texas
RIverside 7-5191

EXPORT—157 Prospect Street, Passaic, New Jersey, PRescott 3-5100

REA Loan Summary

CENTRAL VIRGINIA TELEPHONE CORP., Amherst, Va.; $525,000 loan. REA loans to borrower total $1,279,000. L. JOHN DENNEY is pres., & mgr. . . . VOLCANO (CALIF.) TEL. CO.; $460,000 loan. Borrower proposes to use funds to improve service for its 537 subscribers & furnish initial service to 288 rural families. JAMES W. WELCH is pres., & mgr. . . . FLORALA (ALA.) TEL. CO.; $154,000 loan. REA loans to borrower now total $638,000. LLOYD G. VAUGHN is pres., & mgr.

LEHIGH VALLEY COOPERATIVE TEL. ASSOC., Lehigh, Ia.; $117,000 loan. Borrower has now received REA loans totaling $309,000. G. E. THOMAS is pres.; AUDREY Q. ESLICK is mgr. . . . THORNTOWN (IND.) TEL. CO., $330,000 loan. New borrower plans to improve service for its 763 existing subscribers & to furnish initial service to 143 rural families in its area. OWEN E. CURRY is pres. & mgr. . . . MASON COUNTY TEL. CO., Maysville, Ky.; $1,108,000 loan. REA loans to Mason County Company now total $1,834,000. LeROY T. CARLSON is pres.; JAMES H. CRAWFORD is mgr.

ADAMS TEL. COOP., Camp Point, Ill., $293,000 loan. Adams Co-op., has now received loans totaling $1,047,000 which will make possible new, improved service to 2,299 rural subscribers. LeROY GRIMES is pres. DEAN SEARLS is mgr. . . . TRI-COUNTY TEL. CO., INC., New Richmond, Ind., $697,000 loan. Funds will enable new borrower to improve service for 1,160 subscribers & furnish initial service to 311 rural families. RUSSELL G. MILLER is pres. & mgr. . . . TYGART VALLEY TEL. CO., Mill Creek, W. Va., $60,000 loan. REA loans to borrower now total $346,000 which will bring new, improved service to 721 rural families. BYRON WOODS is pres., & mgr. . . . LOGAN COUNTY RURAL TEL. COOP., Auburn, Ky., $393,000 loan. REA loans to borrower now total $1,136,000 which will benefit 2,144 rural families. W. GASTON COKE is pres., GROVER CORUM is mgr. . . . MIDLAND TEL. CO., Champaign, Ill., $681,000. Funds will enable new borrower to improve & expand rural telephone service in Macoupin county & in fringe areas of Greene, Madison & Morgan counties. JAMES L. CAPEL is pres. & MAX G. HOAGLAND is mgr.

NORTHERN KANSAS TELEPHONE CO., Ottawa, Kans., $2,245,000 loan. Borrower has now received REA loans totaling $4,426,000 which will enable it to furnish new, improved service to 9,468 subscribers in 21 counties. THOMAS E. GLEASON is pres. . . . WESTERN COUNTIES TEL. CORP., Marathon, N. Y., $1,064,000 loan. REA loans to borrower now total $1,438,000. H. RUSSELL CAMMER is pres. & mgr. . . . HOUSTON COUNTY TEL. CO., INC., Crockett, Texas, $2,190,000 loan. New borrower plans to furnish initial service to 1,791 subscribers & improve service for 1,935 subscribers. W. S. BAIN is pres. J. B. McDUFF is mgr. . . . HAVILAND TEL. CO., Haviland, Kans., $152,000 loan. REA loans to borrower now total $760,000. HOWARD ELLIS is pres., & mgr. . . . CLARKS TEL. CO., Clarks, Neb., $152,000 loan. REA loans to borrower total $316,000. VINSON A. BITTINGER is pres., & mgr. . . . ARAB TEL. CO., Arab, Ala., $445,000 loan. REA loans to company now total $1,178,000. L. McDONALD is pres. & mgr.

AMERY TELEPHONE CO., Amery, Wis.; $281,000 loan; REA loans to this borrower total $924,000; GEORGE F. GRIFFIN is pres. & mgr. . . . MARSHALL COUNTY TEL. CO., Room 430, Syndicate Building, Minneapolis, Minn., $1,078,000 loan; REA loans to borrower now total $2,060,000; ELNATHAN GATES is pres. & mgr. . . . VALLEY TEL. CO., Silverton Ore.; $1,172,000 (new) loan; LOWELL E. BROWN is pres. & mgr. . . . WIN-TEL TEL. CO., INC., Windom, Texas; $358,000 (new) loan; JAMES M. WHITWORTH is pres. & mgr. . . . EAST MISSOURI TELEPHONE CO., Bowling Green, Mo.; $208,000 loan; REA loans to borrower now total $650,000; W. R. BUCHANAN is pres. & mgr.

GOLDEN WEST TEL. COOPERATIVE, Wall, S. D.; $167,000 loan; REA loans to borrower total $913,000; INGEBERT G. FAUSKE is pres.; O. S. SOMA is mgr. . . . ARDMORE TEL. CO., Ardmore, Tenn.; $460,000 loan; REA loans to borrower now total $1,062,000; K. W. ROGERS JR., is pres.; and mgr. is N. P. EDMONDSON. . . . WABASH TEL. COOPERATIVE, Louisville, Ill., $276,000 loan; REA loans to borrower total $1,135,000; CHLOREN KRUTSINGER is pres.; VAUGHN BROWN is mgr.

phone Companies of Kansas, Missouri and Arkansas, with headquarters in the V. F. W. Building, 34th & Broadway, Kansas City, Mo. Kreamer has been associated with the United System for over 30 years.

Other officers of the companies are C. A. Scupin, vice president; George A. Hearne, vice president and general manager; O. D. Small, secretary and tresaurer; Dee Adams, assistant secretary and assistant treasurer; H. R. Sidener, auditor and assistant secretary; D. M. Nicolay, assistant auditor; Vivian Merritt, assistant secretary.

Directors of the companies are C. A. Scupin, J. G. Kreamer, George A. Hearne, R. F. Lucier, Paul Henson, H. R. Sidener and O. D. Small.

United Tel. Names White District Mgr.

J. G. KREAMER, president in charge of general operations for the United Telephone Co. of Missouri, has announced the appointment of Charles B. White to the position of district manager at the firm's Maryville, Mo., district office.

White assumed his new duties after 15 years of telephone experience, which began in Garnett, Kans. with the Central Kansas Telephone Co. In 1947, after serving four years with the Army Signal Corps during World War II, he transferred to the Horton, Kans. exchange of the United System.

During his ten years of service at Horton, he advanced to local manager responsibilities. He was promoted to assistant district manager at Maryville, Mo., earlier this year.

He succeeds John O. Tidd, former Maryville district manager, who recently succumbed to a heart condition.

Lindekugel Heads Minnesota Division Of Central Telephone

MINNESOTA properties of the Central Telephone Co. began operating on a divisional basis within the company, effective Jan. 1, with A. E. Lindekugel as manager, it was announced by Vice President and General Manager L. D. Densmore. Headquarters of the division are located at Fairmont, Minn. The Minnesota operations were formerly part of the

company's Western Division, headed by E. B. Samp.

Lindekugel began his telephone career with the Central company in 1933. After early assignments at company exchanges in Minnesota, Iowa, Illinois, and Wisconsin, he became district manager at LaCrosse, Wisc., in early 1952, and three years later was named Western Division commercial manager. He held that post until February, 1957, when he transferred to Fairmont as Minnesota state manager.

National Tel. Co-op Assoc. Meets In Washington, D. C.

- **Bergland, of Iowa Co-op, elected president of National Telephone Cooperative Association; group seeks $35,000,000 for phone co-ops.**

GLEN BERGLAND, manager of the Winnebago Cooperative Telephone Association, Thompson, Ia., was elected 1959 president of the National Telephone Cooperative Association at the NTCA's annual meeting in Washington last month. Bergland, who served during the past year as NTCA vice president, succeeds Riggs Shepperd, of Hondo, Tex.

Named NTCA Vice President was James L. Boss, of Gordonsville, Tenn. B. Maynard Christenson, who heads the Dakota Cooperative Telephone Co., Irene, S. Dak., was reelected Secretary-Treasurer.

At the convention, the association passed resolutions calling for repeal of the 10% federal excise tax on local telephone service, and urging against any increase in the interest rate for Rural Electrification Administration loans. The group also called on Congress to set aside at least $35,000,000 for REA telephone loans to co-ops in fiscal 1960, regardless of the size of the loan authorization voted.

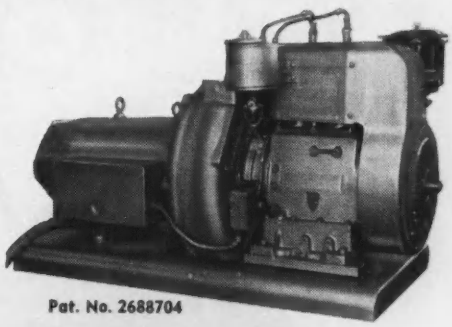
Another resolution requested the US Independent Telephone Association to ask Independents which have REA borrowers as connecting companies to extend to them the same toll compensation agreement as the Independent obtains from its connecting Bell System company. REA was asked to give consideration to the

Please turn to page 78

HERBERT J. LIEN, manager of the Blackduck (Minn.) Telephone Co. and a director of the Minnesota Telephone Association, checks his new Strowger automatic dial telephone exchange. The recent installation at Blackduck of 250 lines and 700 connector terminals, involved an expenditure of more than $75,000. Blackduck, 250 miles northwest of Minneapolis, is another example of Independent telephone expansion — this time into the heart of Minnesota's recreational sportland serving thousands of vacationing outdoorsmen.

NO DROOP DROP or BREAK

AMAZING U.S. MICRO-POWER



Pat. No. 2688704

SENSES...

. . . the slightest drop in voltage. Actually *anticipates* power failure BEFORE voltage drops below a usable level.

ACTS...

. . . automatically to guarantee absolutely uninterrupted power. Not one precious second lost in load transfers.

SAVES...

. . . UP TO $300 PER MILE on new Micro Wave installations. Just one compact Micro-Power Unit replaces a costly array of complicated equipment.

For Complete Information Write . . .

UNITED STATES MOTORS CORPORATION

102 W. FIFTH AVE. OSHKOSH, WISCONSIN

Copperweld "talks better" th

"than any other

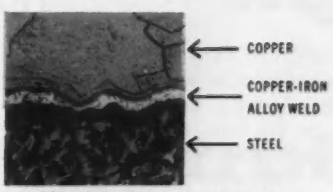
high-strength conductor!

Copperweld Line Wire keeps your subscribers phoning instead of moaning, often boosts toll revenue. Its molten-welded copper covering insures circuits that "speak up"—even on your longest lines.

Non-rusting Copperweld is right for carrier service, too, because its transmission characteristics are almost identical with those of solid copper. In the higher frequencies, they're *better!* Operating at 150 kc's, for instance, the attenuation of solid copper, 104 mil., is .317 db per mile. Attenuation of Copperweld, 104 mil., under the same conditions is .293 db per mile.

Because you can string longer spans on fewer poles, Copperweld reduces construction costs. Copperweld's lasting strength endures even under heavy wind and ice loading. It will keep your maintenance costs down.

You'll find a complete line of economical Copperweld products in Automatic's supply catalog. For quick delivery and helpful service, call your friendly Automatic Electric representative or your nearest A. E. Sales Corporation warehouse.



This photomicrograph of the molten weld shows how the grains of copper and steel interlock to form a permanent, continuous weld.

Automatic's 5 friendly warehouses:

Northlake, Illinois Fillmore 5-7111	2915 Moore St. Richmond 21, Va. ELgin 8-9280	2360 N. W. Quimby St. Portland 10, Ore. CApital 3-7244	158 Corliss Avenue Johnson City, N. Y. Binghamton 7-8507	2021 Main St. Kansas City 8, Mo. HArrison 1-7575

AUTOMATIC ELECTRIC

Subsidiary of **GENERAL TELEPHONE**

NEW,

IMPROVED DESIGN!

Extended mounting slot now fits ALL standard 12" or 8" pin spacings . . . eliminates costly re-boring.

Case® ALUMINUM CROSS-ARM TRANSPOSITION BRACKETS.

Many new carrier circuit designs call for a reduction in wire spacing from 12" to 8". Normally this means thousands of new pin holes must be bored . . . an expensive and time-consuming job. Now . . . the new, improved Case cross-arm transposition bracket with the extended mounting slot fits all standard 12" or 8" pin spacings . . . eliminates the need for costly re-boring, and saves you thousands of dollars per year. If you are planning to re-space and transpose wires from 12" to 8" spacings, be sure to check first with Case.

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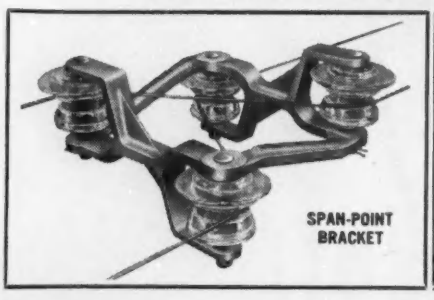
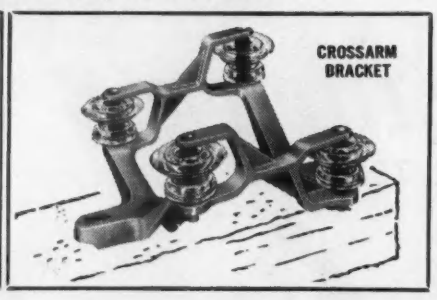




area coverage progress of its borrowers in negotiating toll compensation agreements with the Bell System.

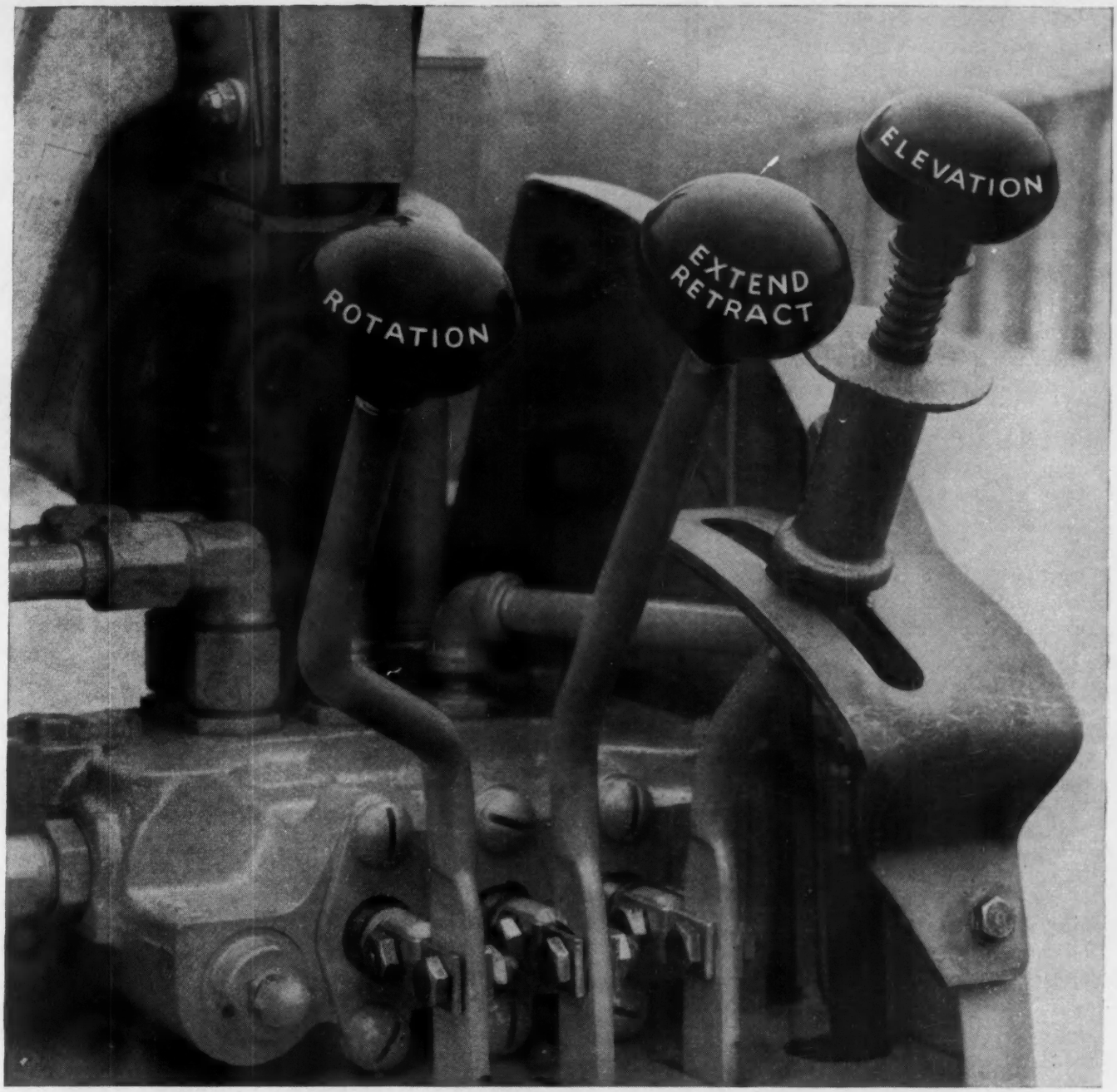
The association also called on REA and regulatory authorities to require, in areas which now are within the franchise territories of existing telephone organizations but are not being fully served, that the organization holding the franchise either provide area coverage or dispose of the properties to a group which will cover the whole area.

Still another resolution stated that in some instances REA borrowers have been competing with each other for acquisition of properties or in signing up prospective members. It asked REA to establish a policy under which such activities would be condemned, and loans would not be made to the competitive group.

Addressing the annual convention of the National Rural Electric Cooperative Association, which followed the NTCA gathering, President Eisenhower declared that the co-ops have reached the stage in their development where they should not rely on federal subsidies. He pointed out that he has recommended a loan program under which interest rates would be raised to a level "that will recover the cost of money" lent by the government. He said that no effort will be made to boost interest rates on existing loans.

Several spokesmen for the Democratic Party addressed the NRECA convention, including Senators Lyndon Johnson (D., Tex.) and John F. Kennedy (D., Mass.).

"He's trying to find a 'spec' on quicksand!"



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NARUC Names New Tel. Committee Chairman

- **Perrine heads NARUC Telephone Committee; Wiggins named.**

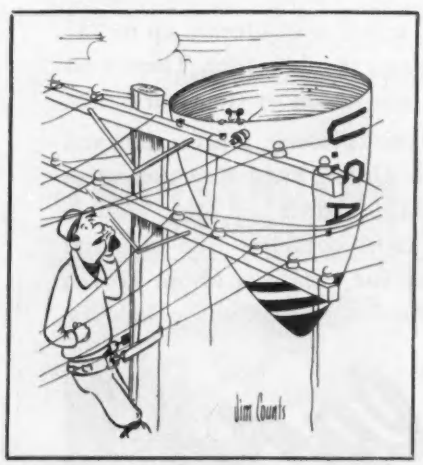
CHAIRMAN George R. Perrine of the Illinois Commerce Commission has become chairman of the Special Telephone Committee of the National Association of Railroad & Utilities Commissioners, and Georgia Public Service Commissioner Ben Wiggins has been named a member of the group.

Both as chairman and as a member of the committee, they replace Georgia Chairman Matt L. McWhorter. McWhorter recently became first vice president, and chairman of the Executive Committee, of the NARUC, with the retirement from public office of New Mexico Public Service Commission Chairman Leroy W. Leibrand, and decided to relinquish the Telephone Committee post in view of his other responsibilities.

Chairman Perrine has been a member of the Illinois commission since January, 1953, and a member of the NARUC Executive Committee since August of that year.

Commissioner Wiggins first became a member of the Georgia commission as an appointee to succeed the late Commissioner James A. Perry. Last fall, he was elected to a full term on the agency. He is a former practicing attorney, and was executive secretary to Governor Marvin Griffin at the time of his appointment to the state commission.

McWhorter was elected second vice president of NARUC last fall, but moved up with Leibrand's retirement.



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complies with REA Specification PE-15

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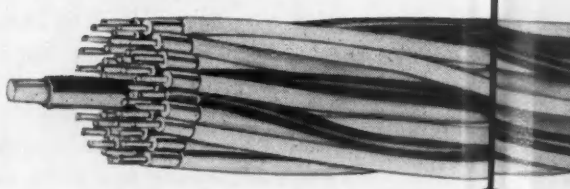
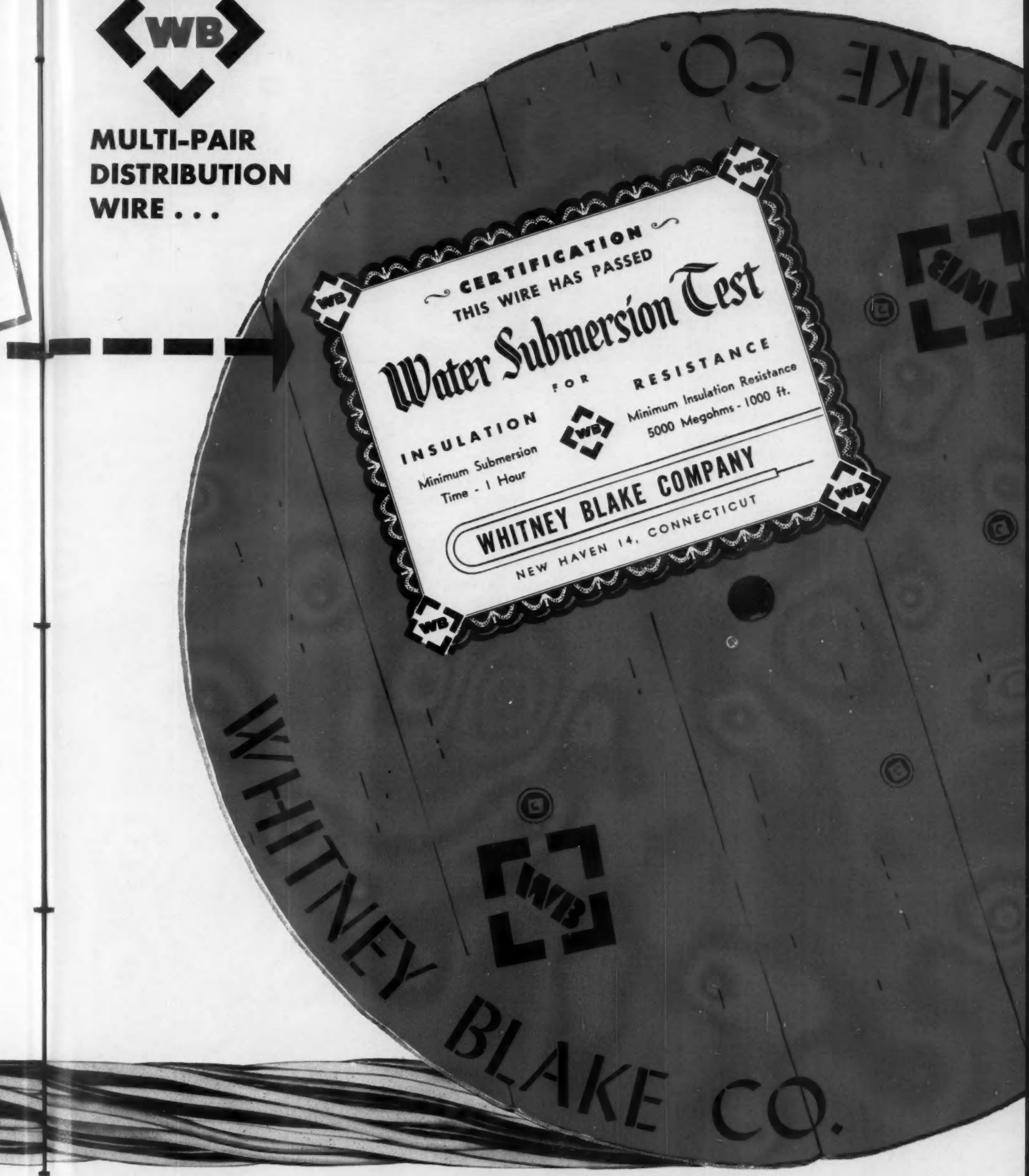


MULTI-PAIR DISTRIBUTION WIRE . . .



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More than 100 Stromberg-Carlson Telecommunication sales and engineering personnel participated in the general meetings and seminars during the annual sales conference held January 12-15 in Rochester. All phases of telecommunications were discussed during the seminars, conducted by the five sales branch managers.

suppliers NEWS briefs

Stromberg-Carlson Holds Annual Sales Conference

"STROMBERG-CARLSON'S Telecommunication Division sales in 1958 reached a new high in spite of the slowdown in the general economy," T. C. Thompson, general sales manager, told his field force recently. Meeting in Rochester for the annual sales conference, the field men were congratulated for their showing during the past year.

In addition to the general meetings during the four-day session, each of the division's five branches participated in seminar-type discussions on new products in all phases of telecommunications. The seminars were conducted by the five branch managers: W. J. Pfaender, Chicago; J. P. Galligan, Burlingame, Calif.; R. F. Fairly, Kansas City, Mo.; W. L. Mollands, Atlanta; and J. S. Ottalagana, Rochester; and C. J. Reynolds, national supply manager. Among the subjects discussed were Toll Ticketing, telephone instruments, switchboard products, carrier systems and components and supply products.

John Voss, vice president and general manager of the division, speaking on the subject "Tomorrow is already here," pointed to some of the advances — particularly in electronics — that have progressed from laboratory to production stage, and stressed that customer interest has shown a marked acceleration in reference to deliveries.

P. J. Lucier and G. W. Schomaker of the Finance Department discussed a leasing program that has proved particularly attractive to the small and medium-sized operating companies.

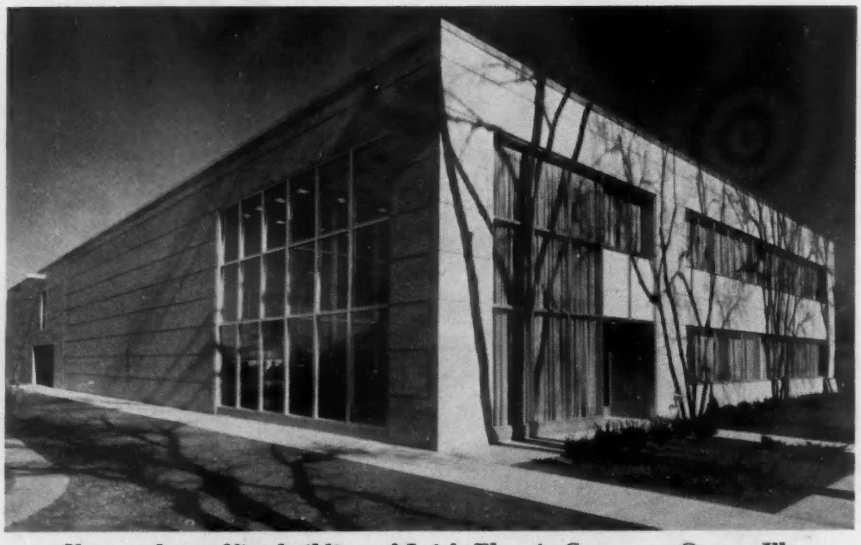
Other speakers at the general meeting who stressed the important role telecommunications played in 1959 included: Robert C. Tait, president; Gordon G. Hoit, executive vice president; Wesley M. Angle, former chairman of the board; and Arthur F. Gibson, secretary.

Leich Electric Co. Dedicates New Office Building

OVER 150 guests, members of local civic groups and officers of General Telephone Corp., were present on December 15, 1958, when Leich Electric Co. dedicated its new office building in Genoa, Illinois. The building is a modern brick and steel structure of contemporary design, and contains 32,400 square feet of floor area.

Leon M. Wells, retiring president of Leich Electric Co., said that the new building was necessary to provide more adequate space for office, engineering and laboratory facilities and for an employes' cafeteria. The expansion, he said, is directly related to the growing acceptance of Leich's communication equipment by the Independent telephone industry.

The new office building, designed and constructed by Ragnar Benson, Inc. of Chicago, is an air-conditioned, two-story building. Modern interior decoration was handled by the Of-



New modern office building of Leich Electric Company, Genoa, Ill.

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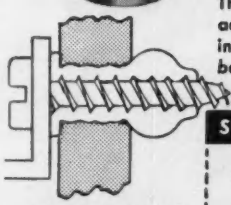

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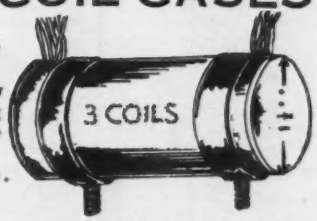
C152 TYPE LOAD COIL CASES

with types C651 (44MH) or C652 (88MH) coils encapsulated in plastic. A new smaller size for mounting directly in plastic cable splice-terminal cases.

TYPE	NO. COILS	MAX. LGTH.
C152A	1-3	3''
C152B	4-9	6¼''
C152C	10-18	13''



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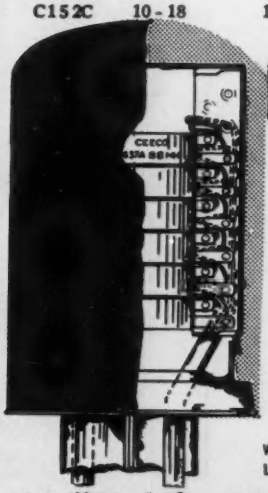

For loading plastic direct burial cables. Uses types C637A (88MH) or C637B (44MH) coils. 6 to 26 pair blocks loaded only as needed. All steel construction provides an easy access for testing, splicing, connecting or for buried drop distribution.

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fice Equipment Co., also of Chicago. Twenty-eight different colors are used within the building.

An interesting feature of the building is an operating Leich Dial System set behind glass partitions in the lobby. This system, which handles over 100 telephone lines serving the new office, is on display for visitors.

The first floor of the building consists of the Executive office area, Purchasing, Accounting and Payroll, Time Study, Process Engineering, and Production Control. The cafeteria, an attractively decorated dining room which seats 188 people, completes the first floor. The entire second floor is devoted to Design Engineering, Specification Engineering, Drafting, Print Reproduction, Laboratory, and a Customer Training Classroom.

Savage To Direct Supply Unit At Automatic

LEROY E. Savage has been appointed director of supply sales, and Bliss K. McCann has been named to

LEROY E. SAVAGE

succeed him as central district manager, in the communication products division, Automatic Electric Sales Corporation.

Savage has a wide range of experience in the communications field. Joining Automatic Electric in 1946, he served as government contract service manager and assistant manager of carrier and radio sales, before becoming central district manager. He is an electrical engineering graduate of Tufts College and holds a master's degree from the Harvard Graduate School of Business Administration.

McCann, former engineering division manager of carrier and radio

BLISS K. McCANN

sales, is a native of Kansas City, Missouri, and received his engineering education at Illinois Institute of Technology. He joined Automatic Electric in January, 1952 as a carrier engineer, and was named western district manager of the division in 1956.

Secode Names Burton Head of Control Systems Dept.

S. DIXON BURTON has been appointed head of the control systems department of Secode Corp. with headquarters in San Francisco. He will be responsible for expanding the firm's activities in the field of industrial and military electronic control systems.

To accept his new post, Burton left Applied Science Corp. of Princeton in Princeton, N. J. where he served for three years as systems and application engineer in the industrial products department. Previously, he was systems engineer at Hammarlund Manufacturing Corp. in New York City. Burton was associated with Bendix Radio Division of Bendix Aviation Corp. for 14 years.

Holan Corp. Announces Executive Appointments

FIVE EXECUTIVE appointments for Holan Corp. and Holan Corp. of

Georgia have been announced by President J. Howard Holan.

At Holan Corp., Herman J. Troche moves from vice president-engineering to vice president and consultant. George H. Eckels is the new vice president-engineering. He was formerly vice president and general manager for Holan Corp. of Georgia.

Robert R. Rector becomes the vice president and general manager at Holan Corp. of Georgia. He was formerly vice president-sales and continues to direct sales there.

Two other changes are effective at Holan Corp. of Georgia: O. H. Stelter, Jr., is now vice president-engineering and manufacturing and Clifford Booker is secretary and treasurer. Stelter was assistant sales manager and Booker was assistant secretary and assistant treasurer.

Argo Named Regional V. P. Of A. B. Chance Company

THE PROMOTION of Dwight E. Argo to regional vice president of the A. B. Chance Co. has been announced. In his new position, Argo will be in charge of all company

DWIGHT E. ARGO

operations in 8 western states including the A. B. Chance Co.'s manufacturing plant and sales service center in San Francisco.

As executive in charge of Pacific Coast operations, Argo will succeed J. T. Isbell who retired from the A. B. Chance Co. on December 31, 1958, after 31 years of service.

Argo joined the company in 1941 as a salesman. He advanced from salesman to senior salesman to district sales manager and in 1954 was promoted to Southwest regional manager. In 1957 he was appointed Western regional manager and was transferred to San Francisco where he will continue to maintain his office.

Milton Staub Elected Pres. Hirsch Organization

MILTON STAUB, vice president and general manager of the Gustav Hirsch Organization, Columbus, Ohio, has been elected president of the firm, filling the vacancy created by the recent death of founder and president Gustav Hirsch.

Staub, who came to the United States from his native Hungary when he was nine years old, retains the post of general manager, which he has held since 1941.

Stockholders at the annual meeting at Columbus headquarters also elected Miss Irene Hirsch, daughter of the founder, chairman of the board and secretary. Other officers elected were Jere S. Cave, chief engineer of the communications division, vice president, and J. F. Edmonson, chief auditor, treasurer.

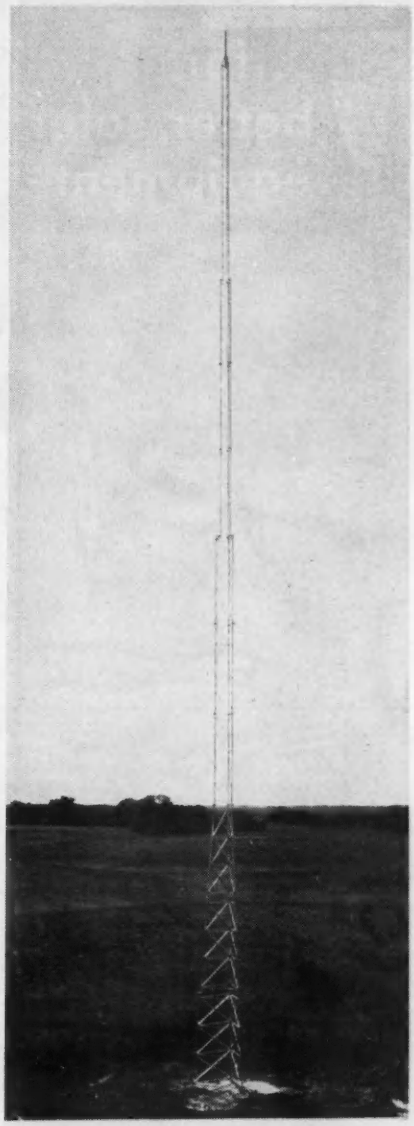
Re-elected assistant secretaries were C. L. Parker, general superintendent; Elenora Hunter, private secretary, and Magdalene Greenwood, estimating division. John H. Van Bommel, European project manager, was newly elected an assistant secretary.

Staub joined Gustav Hirsch in 1929 after previous service with Goodyear Tire & Rubber Co., Akron, Ohio, and United Woolen in Columbus. He attended Akron and Ohio State Universities.

Hirsch, who was born in Columbus in 1876, died Jan. 7 at the age of 82. He founded his world-wide organization in 1908 after a career as soldier and consulting engineer. A veteran of the Spanish-American War, Hirsch was awarded the French Verdun medal for service as an Army signal corps officer in World War I. He retired as a colonel. Prior to military service, he had graduated from Ohio State University in engineering in 1897.

Returning to Columbus after serv-

New ROHN
SELF SUPPORTING
COMMUNICATION TOWER



★ 120 ft. in height, fully self-supporting!
★ Rated a true HEAVY-DUTY steel tower, suitable for communication purposes, such as radio, telephone, broadcasting, etc.
★ Complete hot-dipped galvanizing after fabrication.
★ Low in cost—does your job with BIG savings—yet has excellent construction and unexcelled design! Easily shipped and quickly installed.

FREE *details gladly sent on request. Representatives coast-to-coast.*

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ice in France, Hirsch launched the career that spanned the globe with his enterprises. The Hirsch firm linked east and west coast television for American Telephone & Telegraph Long Lines and built major power installations at Oak Ridge, Tenn., for Atomic projects.

Gustav Hirsch crews have tackled communications problems all over the world from Navy installations in Trinidad, where they had to teach the natives how to use such elementary tools as shovels, picks and hoes, to laying cable under Alaskan icecaps.

Installations have included laying telephone cable across the Isthmus of Panama along the Trans-Isthmania pipeline and putting in telephone exchanges at each end, radar installations in the United States, communications and electrical power projects in federal prisons including Alcatraz, electrical work at the world's largest freight-sorting railroad yard at Russell, Ky., and the first automatic dial system at St. Mary's, O., in 1908.

In 1956, the United States Independent Telephone Association paid tribute to Hirsch for his many years of leadership.

Hirsch's other business activities were extensive. He was vice president and director of Conneaut Telephone Co.; president and director, Warren Telephone Co.; president, Skyway Broadcasting Co.; and vice president and director, Mansfield Telephone Company. He was a director of Elyria Telephone Co.; Cosmo Investors Corp., Jaeger Machine Co. and Market Exchange Bank. He was vice president of United Utilities, Inc., and had other business interests in almost all parts of the world.

Hirsch was a member of the American Institute of Electrical Engineers, American Society of Mechanical Engineers and American Association for the Advancement of Science.

New Regional Changes At North Electric Co.

D. F. SNYDER, sales manager, North Electric Co., has announced several regional changes in the sales division of the company.

T. J. Budiscak has been promoted

T. J. BUDISCAK

to staff sales engineer for states of Wis., Ill., Indiana, Ohio and Mich. In his new capacity Budiscak will assist telephone companies on technical matters during expansion and conversion to North Electric equipment. He was formerly associated with A. T. & T. in the sales division as a sales manager, management development program. Budiscak joined North in July 1958, as a regional salesman for states of Ohio and Michigan.

M. F. Maurer has been transferred from his position as regional sales-

M. F. MAURER

man (Kans., Mo., Ill.) to the same position for the states of Wis., Ill., Ind., Ohio, and Mich. Maurer joined North in May 1953.

C. K. Holser has been promoted from North's Crossbar engineering section as a project engineer to staff

FOR RELIABILITY
FOR SPEED
FOR QUALITY SUPPLIES
FOR PERSONALIZED SERVICE

NOT just because Lindsay provides prompt delivery of nationally known supplies exactly as ordered... but also because of the friendly, personal way we do business, we think you'll like Lindsay. Try us and see!

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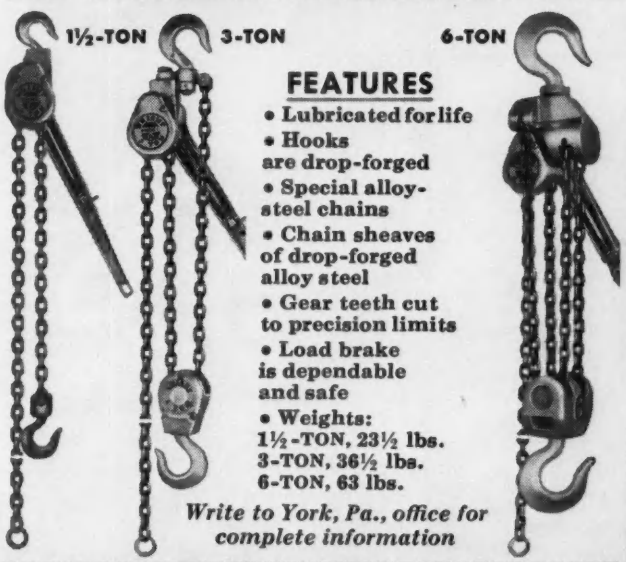
NEW WRIGHT Type "C" Pull-A-Ways

THREE SIZES—1½, 3 and 6-Tons



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  1½-TON, 23½ lbs.
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ACCO

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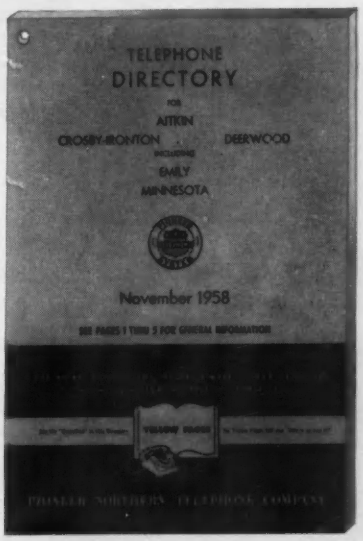

A Directory for the Pioneer Northern Telephone Company

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350 East Twenty-second Street, Chicago 16

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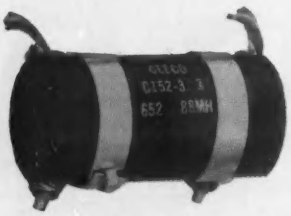
CEECO TYPE C 152 LOADING COIL CASES WITH TYPE C 651 (44MH) OR TYPE C 652 (88MH) COILS

C152-1



C152-3

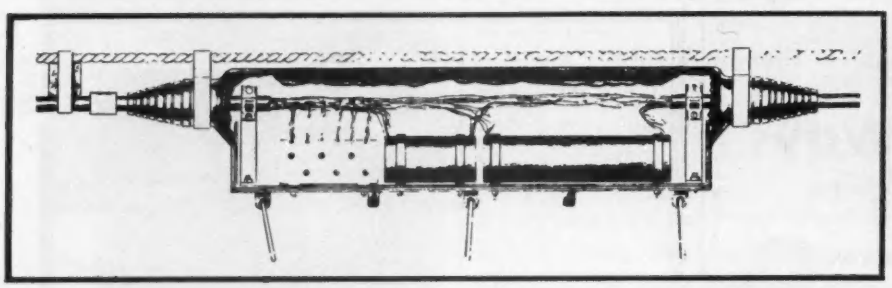
C152-6

★ MOUNT DIRECT IN BURIED WIRE-CABLE TERMINALS AND PLASTIC CABLE SPLICE TERMINAL CASES

★ MOUNT DIRECT IN PLASTIC CABLE SPLICE

★ COILS ENCAPSULATED IN PLASTIC . . . MOISTURE FREE

★ SIZE AND WEIGHTS REDUCED YET MAINTAIN SAME OR BETTER ELECTRICAL CHARACTERISTICS



TYPE C152 CASES MOUNTED IN PLASTIC CABLE SPLICE-TERMINAL CASES

LOADING COIL CASE TYPE	CONTAINS COILS TYPE C651 OR C652	APPROXIMATE CASE SIZES DIAMETER	LENGTH	MAXIMUM WEIGHT
C152A	1 to 3 Coils	1½"	Up to 3"	½ Lb.
C152B	4 to 9 Coils	1½"	Up to 6¼"	1½ Lbs.
C152C	10 to 18 Coils	1½"	Up to 13"	3 Lbs.
C152D	19 to 28 Coils	2"	Up to 18"	6 Lbs.

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Phone EStebrook 8-3109

C. K. HOLSER

sales engineer for Pa., N. Y., and the New England states. Holser has been with North since 1947.

P. E. Ekstrand has been moved from position of regional salesman,

P. E. EKSTRAND

Ia., Neb., and North and South Dakota, to the same position for Pa., N. Y., and the New England states. Ekstrand has been with North since 1955.

R. D. Okerberg Promoted To Chief Engr. at Hubbard

RICHARD D. OKERBERG has been promoted to chief engineer of electrical apparatus by Hubbard & Co. He will operate out of the new Hubbard electrical research and development laboratory in McCook, Illinois.

Prior to this appointment Oker-

berg was chief engineer on another phase of Hubbard development. Okerberg is a registered professional engineer and a member of the A.I.E.E.

Ansonia Announces New Executive Appointments

FREDERICK Kenner, president of Ansonia Wire & Cable Co., has announced that Tilden E. Thompson

TILDEN E. THOMPSON

has been designated vice president in charge of telephone and government sales. Thompson, formerly Ansonia's regional sales supervisor for the West Coast, will work out of the Ansonia plant and offices at Ashton, R. I.

Kenner also announced the designation of John Marsh as vice president in charge of industrial sales. And the appointment of F. E. Corcoran

JOHN MARSH

F. E. CORCORAN

as assistant secretary and assistant treasurer.

Marsh was formerly Ansonia's market specialist for the power utility industry. In his new capacity, Marsh will be based at the company's Ashton, R. I. offices.

Corcoran will continue as Ansonia's Office Manager in charge of Sales.

Welding Equipment and Industrial Regulator Survey

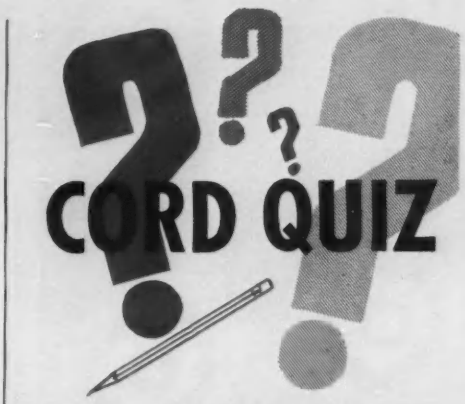
NEW, 24-Page brochure, from Modern Engineering Co., illustrated with cross section drawings, evaluates 50 important design features found in oxy-acetylene welding and cutting equipment and industrial regulators produced by 19 leading manufacturers. 12 Pages of especial interest to welding department superintendents and plant maintenance superintendents; 12 pages on regulators for engineers who work with air-activated equipment or commercial gases in a wide range of industrial applications.

To obtain your free copy write: *Modern Enginering Co.*, 3411 *Pine Blvd., Dept. TE&M, St. Louis* 3, *Mo.*

Automatic Electric Sales Opens Minneapolis Office

AUTOMATIC Electric Sales Corp. has announced the opening of a new district office at Minneapolis, Minnesota.

The new headquarters, designed to improve customer service in the north central states, will direct sales activities in Minnesota, the Michigan



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For time-saving use KEARNEY Airseal — available in convenient sized pads, or in 10-foot rolls.

For Better Construction . . . For Safer Maintenance

Specify

263

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4224-42 Clayton Ave. • St. Louis 10, Mo.

Canadian Plant: Guelph, Ontario

WAYNE LEONARD

Peninsula, the Dakotas, Wisconsin, Iowa and Nebraska.

Wayne Leonard, former Sales Corporation representative in Seattle, Washington, has been named manager of the north central district office. He will be aided by a sales and engineering staff.

Leonard has been with Automatic Electric Sales since 1945. He started as warehouse manager in Los Angeles and after two years became salesman for the Southern California area. In 1950, he was recalled by the U. S. Navy for fleet duty in the Korean conflict. On his return from this service in 1952, he was assigned to the Seattle post.

Exide Names Moore Sales Marketing Mgr.

C. J. MOORE has been appointed to the newly created position of general sales and marketing manager of Exide Industrial Division, The Electric Storage Battery Co., Philadelphia, Pa.

Moore, who has been Exide's sales manager for the past five years, thus assumes direct responsibility for all national sales and marketing activities for Exide industrial batteries, battery-charging equipment and related components.

He continues to make his headquarters at the new divisional offices at Exide's largest plant, Rising Sun and Adams Avenues, Philadelphia.

Joining Exide in 1935, Moore began as a salesman in the Pittsburgh branch. In 1941, he was transferred to company headquarters as supervisor of motive power sales. He returned to Pittsburgh in 1946 as assistant branch manager and became branch manager there in 1947. He again was transferred to Philadelphia in 1949 as manager of the railway and motive power sales division.

U. S. Ind. Chemicals Establishes New Sales Office

U. S. INDUSTRIAL Chemicals Co. has established a San Francisco sales office. Kenneth Fietz, who will be San Francisco manager, has been a representative of the firm's New York Sales Division for the past 16 years. He will report to Robert E. Alexander, Pacific Coast Division manager at Los Angeles.

The new sales office was created to help keep pace with the needs of customers for U. S. I. products in central and northern California and the states of Oregon and Washington. The address of the new office is: U. S. Industrial Chemicals Co., 220 Montgomery Street, San Francisco 4, California. It can be reached by telephone at EXbrook 7-3250.

The new office will be tied into U. S. I.'s automated communications system through Pacific Coast headquarters in Los Angeles. This will facilitate the processing of orders and messages by the company's offices and plants in all parts of the country.

Rex Corp. Forms New Electronic Components Dept.

GILBERT E. BELL, president of the Rex Corporation, West Acton, Mass., (Subsidiary of American Enka Corp.) has announced the formation of an Electronic Components Department and the naming of James D. Kelly, as manager of the new department which will produce components for electronic computers.

Before joining Rex, Kelly was associated with MIT's Lincoln Laboratory where he worked on the prototype SAGE system and on the design of special digital systems. He holds a Bachelor's Degree in Electrical Engineering and a Master's in Business Administration — both from Cornell.

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CABLE SPLICERS. Station Installers, equipment Installers. Linemen, **Experienced men needed. Steady work, good pay.** Henkels & McCoy, 1800 Johnson Street, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

WANTED: Well qualified cable splicers and helpers. Write: Neale Construction Company, 3100 Topeka Ave., Topeka, Kan.

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Experienced in Central Office equipment; all types of toll, including carrier and microwave.

Write or call: California Interstate Tel. Co., 16461 Mojave Dr., Victorville, Calif. Telephone Number: 5-9311—Ask for Mr. Wegforth

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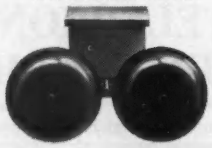
MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service, $15.00 each, Turtle Lake Tel. Co., Turtle Lake, Wisc.

LOUD RINGING EXTENSION BELLS

With 6-inch gongs & non-magnetic aluminum cases



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48 Volt, 8 amp, WE, reg tube 100.00
48 Volt, 2 amp, Lorain, selin 90.00
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24 Volt, 3 amp, Rectifilter 100.00
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#302, as above, equipped with F-4 handset with T-1 transmitter — U-1 receiver (500 type) $15.00

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POLES, Southern Yellow Pine — *Taylor Colquitt Company, 217 E. Main St., Spartanburgh, S. C.*

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*

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WIRE, Insulated Drop and Bronze or Copperweld — *Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.*

Consolidated Appoints Holmes Chief of Tech. Info. Bureau

THE appointment of Roger E. Holmes as chief of the technical information bureau, Consolidated Electrodynamics Corp., has been announced. Holmes will be responsible for preparation of material for the trade and technical press.

During the past two years, Holmes has been editor and publisher of *Industrial Editor & Technical Communications.*

New Services For Electronic Job Seekers

NOW automation has arrived for the engineers and executives seeking new positions during the I.R.E. Show, or whenever they desire. Wm. V. Baker of National Electronics Executives Exchange states that over 8,000 electronics and allied firms are now on cards and classified according to their special fields.

The men merely send their confidential resume to Baker and the information is condensed and coded by numbers as no applicants' name or affiliation is revealed. This confidential resume summary is then sent to the companies in each man's specialized field of work. Baker arranges interviews for interested parties on a confidential basis. Complete information may be obtained by writing to Wm. V. Baker, 14 W. Elm St., Dept. TE&M, Chicago 10, Ill.

T. E. SMITH has been named manager for the eastern district of the industrial products division, Automatic Electric Sales Corp., with headquarters in New York City. Smith formerly served as the Sales Corporation's east central district manager.

L. M. MARKEY, formerly Los Angeles, California sales representative, of Automatic Electric Sales Corp., is the new western district manager, with headquarters in Los Angeles.

Kellogg Swbd. Advances K. H. Benninghoven

K. H. BENNINGHOVEN has been named manager of the newly formed southwestern region of Kellogg Switchboard & Supply Co., with offices and warehouse at 1515 Turtle Creek Blvd., Dallas, Texas.

Benninghoven, a division manager when elevated to his present position, will direct Kellogg sales activities in the five-state area which includes Texas, Oklahoma, New Mexico,

USI Announces Positions To Be Held At New Plant

EUGENE C. CARLSON has been appointed technical superintendent for the new PETROTHENE polyethylene plant of U. S. Industrial Chemicals Co., Division of National Distillers & Chemical Corp. which will be completed early in 1959 at Houston, Texas.

E. P. Richards has been made chief engineer for the new plant, and T. Howard Dantzler has been appointed Superintendent of Operations.

STROMBERG-CARLSON

Transmitter

A DIVISION OF GENERAL DYNAMICS CORPORATION

News and views of Independent telephone people. VOLUME 7, NO. 12 • MARCH, 1959

At your request . . . . . .

561 Subscriber Carrier offered in 5-channel package

Stromberg-Carlson's decision to introduce the new 5-Channel Subscriber Carrier Pole Box is the result of careful study and examination of expansion problems facing telephone companies today *plus* . . . the simple fact that our customers asked for it.

As an integral part of the 561 Subscriber Carrier System it increases the flexibility of systems application. Whether your expansion problems are with you now or in the future, the 561 Subscriber Carrier System can be engineered to suit your needs and budget.

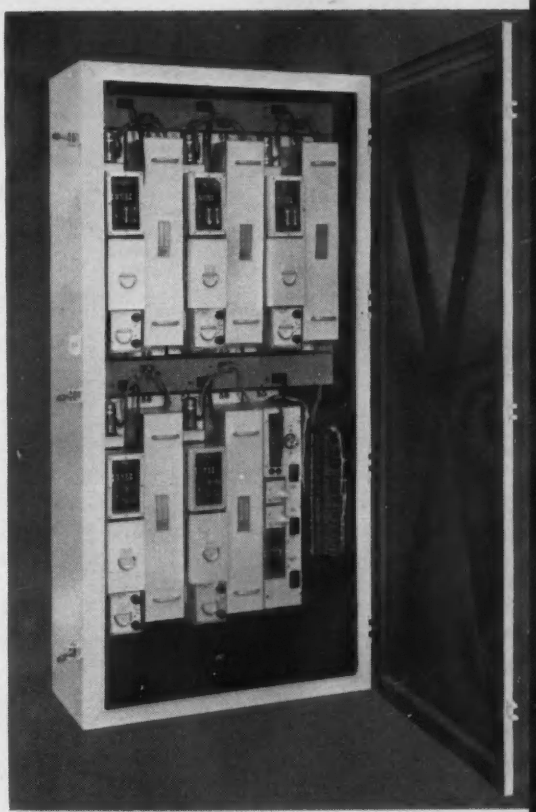
The addition of this new facility makes it economically feasible to provide standard telephone service to potential customers located in isolated small community areas; or in areas requiring temporary service, such as vacation resorts, large scale construction projects and the like; or in areas faced with increased telephone needs due to business expansions and yet not large enough to require a satellite office.

The new 5-Channel Pole Box package can be used as a pole-mounted subscriber carrier or central office terminal, depending entirely upon your expansion problem.

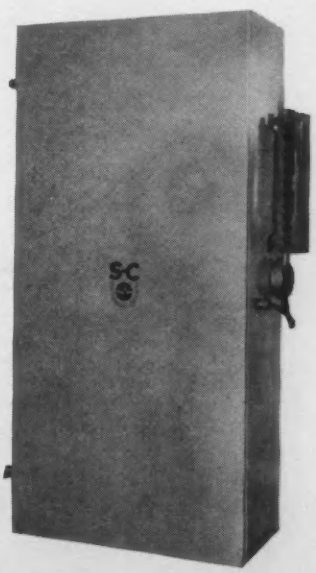
The mechanical design of this new box is directed towards simplified installation and maintenance procedures. All test points are easily accessible. One of the primary prerequisites in its design was to avoid the crowding of components usually encountered when equipment is consolidated.

As a Subscriber Carrier Terminal it offers the space advantages of being able to group five subscriber carrier channels into a single pole box unit; built-in plug-in features that give you the economical advantage of being able to start with a single channel and, when you are ready, expand to as many as five channels in the same unit. Each channel is self-contained and has its own power supply.

As a central office terminal it offers the advantage of being able to economically locate the subscriber carrier central office terminal away from your central office. The 5-Channel unit, when used this way, overcomes attenuation on long cable leads that normally accompany distant extension of telephone service. The Central Office Terminal as well as the Subscriber Carrier Terminal comes completely wired and prepared for five-channel service and offers the same plug-in features enabling you to start with as many channels as required and economically expand to five channels.

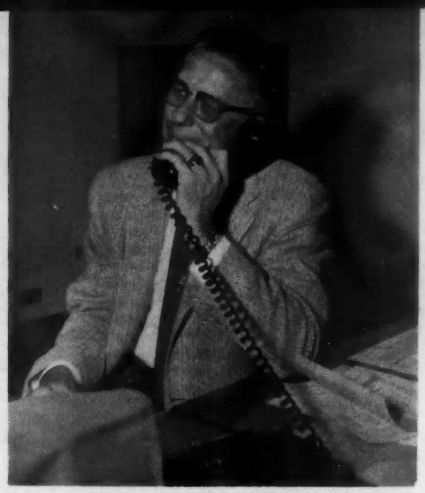


All parts and test points are easily accessible in this fully equipped 5-Channel Subscriber Carrier Pole Box. Its built in plug-in features and roominess make it truly a unit designed with the field maintenance man in mind.



Terminal equipment is housed in a steel cabinet 25" wide, 52" high, and 12" deep and designed for full weather protection. The steel cabinet is primed with a weather-tested zinc-rich paint and double coated with a heat-reflecting baked enamel finish, assuring complete protection under all weather conditions. Lightning protection is accessible from the outside, affording further protection from external hazards.

Advertisement



George Hearne placing first out-of-state call from Lebanon, Missouri, shortly after this exchange of the United Telephone Company went dial.

UNITED TELEPHONE COMPANY
KANSAS CITY 11, MISSOURI

January 9, 1959

Mr. Roegner Cushing
Stromberg-Carlson Sales Meeting Room
Manager Hotel
Rochester, New York

Dear Cush:

If, shortly after [illegible] first call and [illegible] first [illegible] you in [illegible]rnia. Maybe the guy on the other end of the line will have seen. Mrs. Kramer [illegible] that it was a

The Lebanon [illegible] placed the first [illegible] collect call [illegible] I should have been telling you this -

We just cutover Lebanon. It was really a smooth one. The rural lines were not connected until their stations were changed the next day and we did not have one single case of any kind of trouble. Quite a good job by your people as well as ours as to equipment and outside plant. Lebanon has 3300 stations so not one single case of any kind of trouble is better than par for the course. Fred, Al and Ed and your other people there gave our crowd a nice early morning party. When we left for home - 15 hours after the cut, we still had not seen the first case of trouble. Why run away and not enjoy such good cutovers as this.

Hope you learn something there at [illegible] By the way, [illegible]

Yours very truly,

UNITED TELEPHONE COMPANY OF MISSOURI

GEO. A. HEARNE
Vice President and
General Manager

GAH:jb

Why

1) The best starting place is the beginning, with the former Lebanon office. Location was perfect, so . . .

2) Why move? After all, [illegible] double [illegible] there's nothing like [illegible] to keep

5) Really now, Mr. Hearne, is this any way to treat a lady? Obviously this can't go on long . . .

And it didn't.

George Hearne, vice president and general manager of the United Telephone Company of Missouri, was on the phone. The call was out-of-state — and collect.

At the other end was Roegner Cushing, Stromberg-Carlson sales representative who had "sold" the Lebanon, Missouri, dial job, then had been transferred to California during the interim. Mr. Hearne's letter tells one part of the story — the final result of months of careful planning, skillful installation, meticulous testing.

But just before "Transmitter" press time came a packet of photos so interesting that page layouts were torn up gladly. The usual story of another customer completely satisfied in his choice of XY Dial, becomes the *unusual* account of how the United Company achieved their objective at Lebanon.

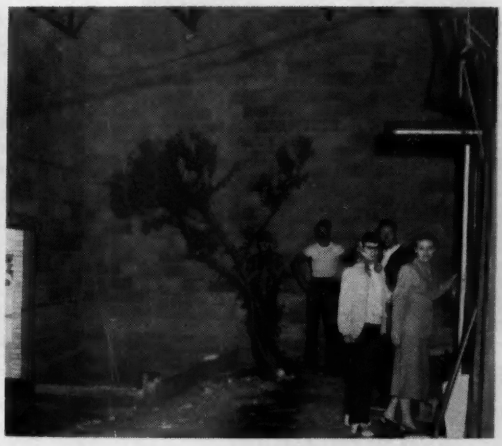
The method followed was not easy and required the finesse of a stage manager changing scenery with minimum interference to the continuous drama. But unusual challenges are not strangers to this company, whose working principle is, "If it should be done, we can do it."

Lebanon is just one of several large exchanges being converted in the United Company's modernization program. And when the next office is cut over, Mr. Hearne, don't hesitate to place another collect call!

You'd never believe what went on beneath this calm exterior — unless you've followed the sequence below.

run away?

After all, ...ouble walls and two roofs ...ing like ...o keep the heat out.



3) Lobby color scheme and furnishings still a bit hazy. At least floral decorations are in place. Girls, that door . . .

4) . . . leads to the switchboard, where the latest in operaters' chairs are being demonstrated . . . air cooled and oh-so-solid!

"Er . . . . . excuse me, Mrs. Kreamer. Did I hear someone say this was a collect call?" Jack Kreamer, just to the right of Fred Fairly, is most amused by this little byplay between his wife and Fred.

Advertisement

Warm welcome in spite of weather, as Lavola Earhart of Jefferson, Iowa, enrolls as first woman customer-student at XY Training School.

Duck, boys! Here comes a woman!

There always has to be a first. Possibly Miss Lavola Earhart of Jefferson, Iowa, didn't know that she was to become the first woman customer-student at the XY® Training School. The instructors knew, and with crossed fingers hastily edited their notes.

Miss Earhart was more than equal to the occasion —after all, she had been selected by Gene Daubendiek of the Jefferson Telephone Company to take an important post in what has usually been considered strictly a man's world.

"We might as well call you Wire Chief," Gene had said. And this training in Rochester was an expected part of the job.

Lavola Earhart began her career with the Jefferson Telephone Company as a full-time operator right after high school. Before long she had become a supervisor. When Jefferson converted from common battery to XY Dial and Toll Center, some girls left . . . . Lavola was promoted.

"It's a wonderful company," said Miss Earhart. "I just hope that with this training I can justify their faith in me. Now if you'll excuse me, I'll go back to studying my circuits."

Following the same general program as all the others, Lavola receives pointers in relay adjustment from instructor Joseph DiVita.

"At first I was allergic to blueprints." Other students, such as Paul Landry, C.O.M. technician from Mather Air Force Base, helped unravel the maze.

"This I understand perfectly." And with a dexterity based on experience changing out subscriber lines at Jefferson, Lavola approached the MDF.

Ex-operator Lavola drops in for a chat with Emily Patt and Elaine Klaus at Stromberg-Carlson XY-PBX attendant's board.

Mary stands on platform to maneuver stock "just the way she wants it" as set-up man Tom Guido holds steel in place. Tom has already adjusted machine to co-ordinate feed with built-in roller action.

Never underestimate the power of a woman

"Just 4′ 10″ and 104 lbs., but she handles that 75 ton 'automatic' like a baby."

That's Bill Tevendale's complete and accurate report on Mary LaDelfa, punch press operator, mother, and practically a "jack of all trades," as the accompanying pictures will testify. Bill is foreman of the punch press department.

If you're an advocate of "never underestimating the power of a woman," then you'd have no difficulty applying it in this case. Bill Tevendale is such an advocate. When he learned his department was to get two inclined automatic punch presses, the first person who came to mind for operating both was Mary La Delfa.

This mother of three little girls has proved herself — during the past six and a half years — a capable punch press operator. She has always worked in the punch press department — one of the first women, for that matter — and has earned her present position by starting on the smaller punch presses and working her way up. Now she is the first woman to operate these huge automatic punch presses for the production of parts familiar to many of us.

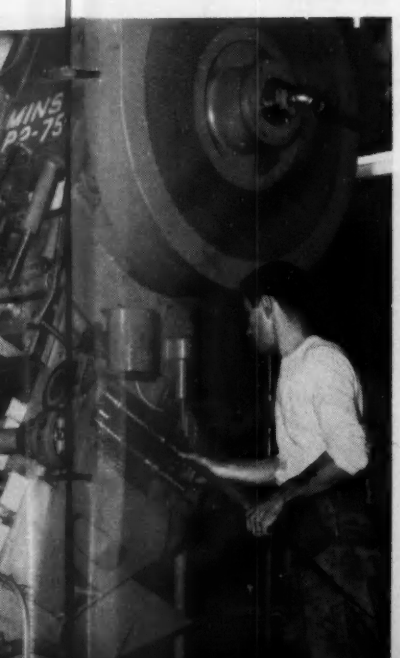
The punch press department has other big presses in use, but these, operated by Mary LaDelfa, are the first *inclined* presses; that is, the entire machine is built at an angle. The addition of these presses has given the department's increased operations several distinct advantages.

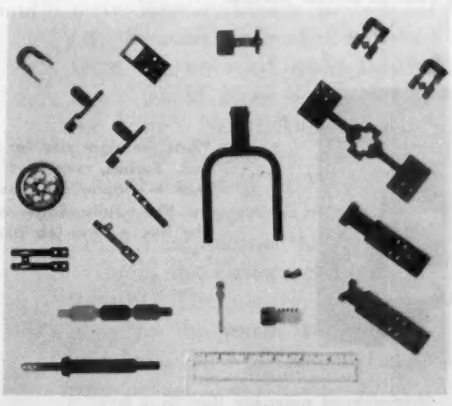
These inclined presses can use the same dies normally found in the smaller turret (upright) presses; dies last longer, too, because the new machines are really rugged. Meanwhile, the smaller punch presses are released for short-run production of less critical parts. In addition, because the new presses are inclined, away from the operator, an automatically controlled blast of air on the punched part helps it fall away before the next piece is punched. That's faster. In fact, production of parts using the new automatic punch presses is up as much as six times.

Commonly referred to as "automatics," the big machines become that only after careful and orderly manipulation and adjustment of the metal stock by this petite operator. All doubt is erased as you gaze in amazement while watching this tiny woman control this gigantic and important machine. Now, we're not saying that some day we'll have a woman for president or some such thing, but you can be sure we'll never again underestimate the power of a woman.

Getting ready for business. Mary LaDelfa, punch press operator, and Tom Guido, set-up man, up on platform, slowly slide die into place on the huge automatic 75-ton punch press.

With a little help (a chain hoist) this petite lady lifts heavy roll of metal stock. Machine handles metal up to ⅛″ thick, 6″ wide.



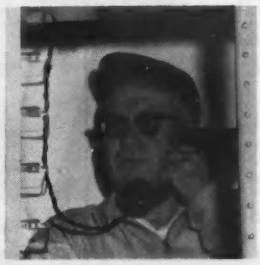


Recognize these parts? You'll find them in relays, telephone instruments, handsets and other equipment. Fast, new machines produce these to keep pace with demand for critical items.

Allez oop! The little lady carries more than her weight . . . about nine times as much. This roll of steel weighs over 900 lbs.! Mary maneuvers stock into position for feeding huge punch press. Together, the 2 presses can punch out over 21,000 parts/hr.

Interlochen State Park offered everything except enough time to enjoy it.

If you don't go for climbing Sleeping Bear Dune on foot, these cars are a thrilling substitute.



No frame-up! John Sattler, manager of Leelanau Telephone Company, answers call from son Medford, out on pole line.

Red cherries, Michigan

"Don't you get tired of going back to the same place each summer?" Our Fred was talking with his pal from across the street.

"Not when it's Michigan," replied Kit staunchly.

And now we know what Kit meant. Our route took us not only to this wonderland of blue water, white sand and red cherries, but to the very cottage of our neighbors — one of the first "summer customers" of John Sattler of Leelanau County.

To reach this northwest corner of Michigan's "Mitten," we had ferried across from Wisconsin. Two small boys, making the same run, became engineers-in-charge of loading freight cars and — precisely at dawn — turned up for the unloading on the Michigan side. They were pop-eyed by four rainbow trout that (according to my story) I had caught on a line thrown over the stern.

We ran into them again while climbing Sleeping Bear sand dune with John Sattler; later while having lunch in Glen Arbor, one of John's

Summer children. Mr. Theodore Esch, president of the Leelanau (Michigan) Telephone Company, and children of the Mexican cherry pickers who each summer help him harvest rich crop at Sutton's Bay. In the business for 38 years, last summer Mr. Esch was oldest grower in annual parade.

"Just the right size for a jacket." Mrs. Forbes measures out deerskin — trophy of a hunting trip by Ken. Julia Sage wonders if she has a new job assignment.

Shirt-sleeved manager Ken Sage has his "office" between stock room and XY Dial room. Julia Sage directs operation of the business office at Central Lake headquarters.

Advertisement

Portion of lobby of the Traverse Bays Telephone Company at Central Lake. Ken Sage believes that the telephone office should reflect good taste, be a pleasant place for customers to visit.

Ken Sage has installed Duotherm Sun Glass electric heating panels in unattended offices — practical answer to Michigan winters.

Mr. and Mrs. John Sattler have assembled a sizeable network of exchanges covering most of Leelanau County. They also are boosters extraordinary for this hauntingly beautiful section of Michigan.

blue water, white sand: says, "Come back."

prosperous resort areas; and once again in Cedar — home and headquarters for the Sattler enterprise. Each time the boys said reproachfully, "Why didn't you take us fishing?"

From Frankfort to Empire, where we were to meet the Sattlers, each turn in the road adds another brush stroke to a mural of unspoiled, indigenous charm. We might have been annoyed at a fixed appointment except for two facts: the Leelanau Telephone Company exchanges are pinpointed in the heart of this vacationland, and the genial manager feels a missionary's zeal for interpreting its beauty to the unbaptized.

This company is successful because of one man's determination to unite and develop the "unprofitable fringe." It has been slow, often discouraging, for John Sattler. Perhaps the greatest single shot-in-the-arm came when the Stromberg-Carlson Loan Department saw the future potential in this area, made possible the conversion of all five exchanges to XY Dial.

Lake Michigan and the many smaller lakes temper the climate, making the region on both sides of Grand Traverse Bay the Cherry Center of the nation. Bumper crops of prunes, apples, peaches, garden vegetables and — more recently — hundreds of acres of strawberries under irrigation give a sound year-round curative to the seasonal ups and downs of vacationism.

We followed nearly every mile of John's pole lines: "stealing" a few cherries while the owner stood by smiling; color-shooting the cerulean blue of the Bay; thankful guests of Mrs. Sattler that evening as rain beat a frustrated staccato on the tin roof. The next day we parted at their Lake Ann exchange — after exploring the Sattler's "retirement hideaway"; pushed on the few miles to Interlochen and had our tent up in plenty of time to enjoy a Saturday evening camping.

This campsite is almost *too* civilized, but the hot shower and automatic laundry shacks are well screened; the same white sand stretches far from the crowded main beach; the pines would have been selected for the King's Navy. And that evening, while we relaxed by our fire, intermittent strains of Brahms and Gershwin drifted over from the National Music Camp across the way.

Could the Eastern Shore be as delightful? The answer, helped exceedingly by the warm welcome of Ken and Julia Sage of Central Lake, is a resounding "Yes!"

The same general characteristics are repeated: it's mostly a matter of scale . . . larger lakes, more acreage under cultivation, more people needing telephone service.

Ken Sage, like John Sattler, is no recent immigrant. His home borders his father's farm, and trees he planted as a boy make a cheerful hearth-fire in winter. Several years away from home — in various phases of the telephone business — convinced Ken that he should return for good. Decision taken, he set out to make the telephone properties a healthy business with service equal to the best. How well he has succeeded was illustrated on a recent trip to R. E. A. Washington headquarters where the Traverse Bays Telephone Company is used as a "demonstration" model.

In a circle tour of his eight XY Dial exchanges, now serving over 1700 customers and growing by an even 100 annually, we saw people at work — in canneries, lumber and paper products, a trailer factory, miscellaneous small assembly plants and everywhere engaged in agriculture. People at play — in boats, on the beaches, in organized camps, just relaxing. Some were fortunate enough to be born here. Others — once having tasted the offerings — say, "Michigan, I'll be back."

Medford Sattler, John's son, stands by door of Glen Arbor office, which is intentionally unobtrusive in its natural woodland setting.

Leasing:

Favored by many companies

Many telephone companies want:

1 — To advance their schedule for dial conversion;

2 — To improve toll revenue by installing Toll Ticketing;

3 — To upgrade their system through application of carrier or microwave;

4 — To provide commercial service for new business customers;

5 — To solve the problem of equity deficiency in support of these programs, or in acquiring new properties;

6 — To accomplish this without issuing capital stock that would affect control of the company.

Some of these companies turned to Stromberg-Carlson — asked if Stromberg's Loan Program could be broadened to include a leasing agreement. Now, after more than a year's practical experience in this area of financial assistance, the soundness of the approach is definitely established.

While leasing as a means of financing equipment is quite clearly applicable to many smaller companies, the same principles can often be applied with equal justification to the larger companies as well.

What can be leased

A lease agreement can cover any or all of the following items:

Central Office equipment
Toll Ticketing equipment
Carrier (toll or subscriber)
Microwave Multiplexing gear
PBX (manual or dial)
Key Systems (commercial)
Station apparatus (telephones)

Many companies find it to their advantage to combine a *lease* covering these items with a *loan* for outside plant, thus overcoming an equity deficiency without having to sell stock.

Marginal savings

Because the rentals paid under a straight lease agreement can be a deductible expense for tax purposes, leasing gives the effect of an accelerated depreciation rate: 20% with a 5-year term, 10% with a 10-year term. With electronics already influencing the art of telephony, the benefits of technological advances in certain fields may become available sooner than now anticipated. Through leasing (with accelerated depreciation) these still-to-be-marketed products may become economically feasible when they are offered.

Under the Stromberg-Carlson lease agreement, no cash outlay is required until the first rental payment is due — often several months after installation. Thus the initial rental has already been produced in revenue earned, and subsequent payments can be met out of income.

For the larger telephone companies, leasing affords a means of postponing, for as long as desired, capital financing (either equity or debt) until the most favorable market conditions — national or local — are present.

Complete service

The Lease Program is but one part of the complete service — survey, appraisal, financial counseling, engineering, manufacturing and installation — available from Stromberg-Carlson, the pioneer in the field of telephone company financing.

Through its long experience, the Finance Department is qualified to advise on the method of financing best suited to the individual company and situation. In many cases, the advantages of leasing can be demonstrated.

Weather-resistant telephone

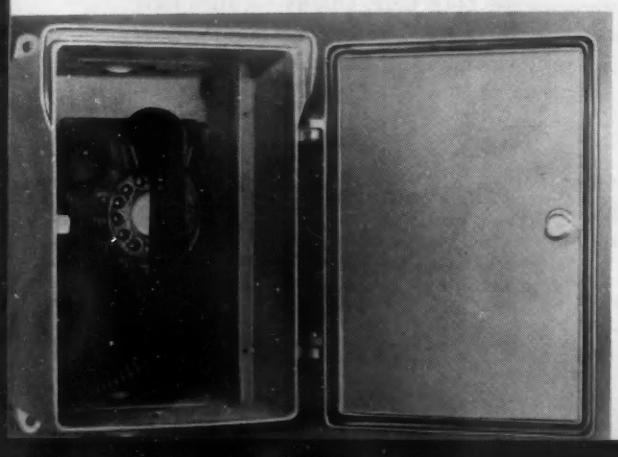
Operating companies may now offer subscribers truly reliable weather-resistant telephone service — a standard "500" type wall telephone in a rugged enclosure suitable for outdoor use under normal weather conditions.

The unit has been designed for convenience as well as easy installation by telephone personnel. A 1553-W Wall Telephone, equipped with a No. 27 handset and retractile neoprene cord, is mounted by three stand-offs in a heavy-gauge cast aluminum casing with a full-swinging door.

The enclosure has a screened vent on the underside, and a detachable fitting threaded for ½" pipe for line entrance.

On the roof, directly above, a detachable flat plate covers an alternate entranceway, so that the installer can bring leads from either top or bottom and shift weather-tight fittings as necessary.

Cork gaskets are used on all fittings, and a neoprene shield serves as shock-absorber and door seal. A locking mechanism is available when so ordered. Lips of the casting are drilled for easy mounting with lag bolts. Grounding as deemed necessary will be made at installation.



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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

"Squirrel Trouble"

LAST MONTH, New England Bell Telephone Company was all shook up over the New Hampshire bears who were shaking telephone poles loose. This month word comes from Southern Bell that they are having trouble with Georgia's squirrels. Seems that Bushytail likes to chew or gnaw off the insulation around the cables suspended between poles.

They've tried all kinds of methods to outfox Mr. Bushytail but only one has worked: Hardware cloth wrapped around the cable kept the squirrels out — and kept the repairmen out, too. Southern Bell is thankful they don't also have the problem the Georgia Power Company has. Woodpeckers clipped the power company for $38,000 worth of poles last year.

Out Of The Past

WEIRD ASSORTMENT of items used to be carried by splicers, reports *Walt Crozier*, splicing foreman in Jackson, Mich. He says, according to the 1913 handbook of "The Design, Construction and Maintenance of the Telephone Cable Plant," splicers were equipped with 31 different items, most of which seem amusing — not to mention obsolete — today.

To name only a few, there were two- gallon-size, coffee pots carried. No, not for coffee. One was filled with sealing compound, the other with paraffin. The splicer also toted another gallon jug. It was filled with gasoline for stoking the plumber's gasoline furnace, also part of his equipment. In addition, he took with him paper sleeves, a sheet of manila paper, four yards of flexible oilcloth, a tarpaulin, and rolls of muslin.

War, W. Va.

NOT SO long ago *Kathy Demick*, toll operator in Wyandotte, Mich., reported she and her co-workers thought a bunch of Indians might be invading the office anytime. According to Michigan Bell's magazine, this all came about when *Vera Perrault*, another toll operator, rang a customer to tell him she was ready with his call.

Everyone heard Vera say: "Ready with your War party." She was too. In case you didn't know, there's a town of *War* in *West Virginia.*

Dog's Work

THE NORTHWESTERN Bell magazine tells about one of their men who installed a telephone in a trailer that had been winterized with metal panels beneath it. There was no room for him to crawl under with the necessary wire. Solution: He tied one end of a cord to a Pekingese's collar, the other end to the wire. The little helper was pushed under the trailer while his mistress called him from the other side.

Put To Good Use

EVER wonder what became of old magneto phones? We can tell you about some of them. The Methodist Men's Club in Taylorville, Ill., we read in *Together*, has undertaken a telephone missionary project. It is reconditioning some of the oldtimers for the use of a Methodist missionary in Portuguese East Africa.

Kid-Talk

WHEN an operator answers a signal, she never knows what will come next. Children on the line, as any operator can testify, can sometimes make life interesting. As reported in Roy Vanett's *Danville Diary* column in the Danville *Commercial News*:

One local child calls and tells the operator "My mommy told me to call up if I get lonely. She says the operator will talk to me."

Another child is a candidate to replace Dennis the Menace, according to Vanett. He simply picks up the phone and says, "Peek-a-boo!"

"These extension telephones sure are handy!"

MOTOROLA MICROWAVE IS PERFORMANCE-PROVED IN THOUSANDS OF APPLICATIONS

Literally millions of orders and instructions by voice, printed message and control signals are carried by Motorola Microwave systems every day. No wonder large and small organizations find owning Motorola Microwave pays communications dividends. In every installation, Motorola operating flexibility, long-life service and all-weather dependability is a service proved fact.

Simple, "building-block" components can be fitted to your operations to provide for any combination of voice, control and data transmission, including 2-way radio operation. With the future in mind, Motorola design provides low-cost, add-on units for functional changes and expansion.

Motorola Microwave operating 1 to a 1000 miles or more has returned its cost many times over by maintaining year around uninterrupted communications. Whether the job calls for spanning city streets, rivers, plains or mountains, you can rely on Motorola Microwave. Gain proven performance . . . highest reliability . . . lowest operating costs . . . and easiest maintenance . . . with Motorola Microwave.

Write for Microwave Bulletin and "on-the-job" microwave articles.

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Yes, the "Yellow Pages" revenues,in the more than 800 directories we now produce for large and small Independent Telephone Companies, prove the statement "DIRECTORIES MAKE MORE MONEY WITH OUR 'REVENUE MEN' ON THE JOB."

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